For Reference

NOT TO BE TAKEN FROM THIS ROOM

For Reference

NOT TO BE TAKEN FROM THIS ROOM

Ex libris
universitatis
albertaensis

UNIVERSITY OF ALBERTA
QUAECUMQUE VERA

University of Alberta
Printing Department

Digitized by the Internet Archive
in 2018 with funding from
University of Alberta Libraries

https://archive.org/details/patternsofpercep00elsi

Thesis
1963 (F)
#10

THE UNIVERSITY OF ALBERTA

PATTERNS OF PERCEPTUAL PERFORMANCE IN CHILDREN WHO ARE SEVERELY RETARDED IN READING

by

Elsie Bradshaw

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA

September, 1963

ABSTRACT

This study attempted to identify patterns of perceptual performance of a selected group of severely retarded readers in an effort to define these patterns as predictors of difficulty in learning to read. A group of achievement and aptitude tests were administered and the results were analysed.

The group investigated was the twenty-three members of the Adaptation Classes under the direction of the Special Services Division of the Edmonton Public School Board. These pupils, within the ages of ten to fifteen years, were a group of severely retarded readers who had been segregated into special classes for remedial help. Sight vocabulary, word recognition, oral reading, silent reading, comprehension, letter names and sounds, and associative learning were tested individually for this study while visual, auditory and kinaesthetic aptitudes and spelling were measured by group tests. Results were compared and analysed for individual students and the whole group.

Comparisons of group and individual results in achievement tests revealed a wide variety of performances. These inconsistencies were greater among individual students than for the group as a whole. The most common characteristic of performances in the tests of sight vocabulary, word recognition, oral reading and spelling was the large proportion of correct beginnings for words as compared to the small number of correct endings. At the easier levels of these tests the majority of substituted words were meaningful. At the later levels, when phonetic

analysis was attempted, meaning was neglected and many of the substitutions resulted in nonsense words. Vowel errors were fairly consistent at all levels. In the test of silent reading, rate exceeded both accuracy and comprehension for most of the students in the group. Many of the errors in the test of naming and sounding letters were caused by inaccuracies in associating the short vowel sounds with their symbols.

When the results of the aptitude and associative learning tests were compared variations in individual results were a notable feature. The lowest results for the group were observed in tests which required the application of visual perception to word-like forms. In tests which required the ability to remember and reproduce letters and words in correct sequence when all stimuli were visual, group results were very low.

When performances in auditory, visual and kinaesthetic perceptual areas were compared and analysed, a wide variety of results were apparent for individuals and the group. There was little evidence of the transfer of skills as measured on the various aptitude tests to actual performance in reading and spelling. The greatest difficulty for this group of retarded readers was the difficulty of combining visual, auditory and kinaesthetic performance with memory for the sequence of letters and words.

The conclusion was reached that no definite patterns of perceptual performances were present in the test results for individual students. When group results were analysed, visual perception which involved memory of letters and words rather than abstract figures was consistently low.

Results of tests of motor skills which did not involve letter or word forms resulted in superior performances by the group. However, when kinaesthetic responses required the reproduction of letter or word forms, this group of retarded readers were inferior in performance. No definite patterns of group performance were evident in the test results for auditory perception, although faulty memory for letter sequence was a factor in a number of the individual results.

Further study to determine the effect of kinaesthetic performance and memory on auditory and visual perception is suggested. Test results should include the performances of achieving readers as well as those who are retarded. There is a need for the development of diagnostic instruments which can be administered and interpreted by teachers.

There was some evidence that perceptual performance was influenced by the type of test materials and the method of presentation of the tests. Results should be investigated when other test materials and different methods of presentation are used with normal as well as retarded readers.

The tests of aptitude and associative learning showed the most evidence of consistent performance which might indicate difficulties in learning to read. However, it was not possible to measure results in any one area of perception without involving the use of skills in other areas. More precise tests of aptitude and associative learning are needed.

ACKNOWLEDGEMENTS

The writer wishes to express appreciation for the cooperation of the teachers of the Adaptation Classes of Queen Mary Park School, Miss F. Threlkeld and Mrs. N. Yakemchuk, for their assistance in administering the tests. Special acknowledgement is made to Doctor Marion Jenkinson for her direction, assistance and encouragement. Appreciation is also expressed to Professor Muriel A. Affleck and Doctor W. B. Dockrell for their helpful suggestions. To Mrs. Darlene Carter, sincere appreciation is extended for her assistance in organizing and typing the manuscript.

TABLE OF CONTENTS

CHAPTER PAGE

I. INTRODUCTION 1

The Problem 1

Statement of the Problem 1

Purpose of the Study 3

Questions 4

Organization and Procedure 4

Assumptions 6

Limitations of the Study 6

Significance of the Study 7

II. RELATED STUDIES 9

Visual Perception 10

Auditory Perception 11

Kinaesthetic Perception 13

Trends in Research 14

Summary 18

III. DESCRIPTION OF PROCEDURE 20

Research Population 20

Areas Which Were Tested 26

Tests and Testing Procedures 27

Temple University Inventory of Sight Vocabulary and Word Recognition Skills 28

Description of the Test 28

Procedure in Testing 30

Individual Results of the Test of Sight Vocabulary and Word Recognition Skills 31

Group Results of the Test of Sight Vocabulary and Word Recognition 31

Comparison of Results of Group and Individual Performances on the Test of Sight Vocabulary and Word Recognition Skills 33

Summary of Findings 36

Schonell's Graded Reading Vocabulary Test 36

Description of the Test 36

Procedure in Testing 37

Individual Results of the Test of Word Recognition 39

Group Results of the Test of Word Recognition 39

Comparison of Performances of Group and Individuals on the Test of Word Recognition Skills 42

Summary of Findings 43

Neale Analysis of Reading Ability - Oral 44

Description of the Test 44

Procedure in Testing 44

Individual Results in the Test in Oral Reading ... 46

Group Results in Oral Reading of the Neale Analysis of Reading Ability 48

Comparison of Performances in Oral Reading for the Group and Individuals 49

Summary of Oral Reading 52

Neale Analysis of Reading Ability - Silent 53

Procedure in Testing 53

Individual Results in the Test of Silent Reading 54
Group Results in Silent Reading 54
Comparison of Performances in Silent Reading of the Group and Individuals 56
Summary of Silent Reading 57
Neale Supplementary Diagnostic Test I 57
Names and Sounds of Letters 57
Description of the Test 58
Procedure in Testing 58
Individual Results in the Test of Naming and Sounding Letters 58
Group Results in the Test of Naming and Sounding Letters 59
Comparison of Group and Individual Performances .. 60
Summary of Naming and Sounding Letters 61
Monroe-Sherman Diagnostic Reading Aptitude and Achievement Tests 61
Description of the Test 63
Procedure in Testing 64
Individual Results of the Group Diagnostic Reading Aptitude Tests 64
Group Results in Aptitudes for Reading 67
Comparison of Group and Individual Results in the Tests of Reading Aptitude 75
Summary of Findings 75

Gates Associative Learning Tests 76
Description of the Tests 76
Procedure in Testing 76
Individual Results in Gates Associative Learning Tests 77
Group Results of the Gates Associative Learning Tests 77
Comparison of Performances for the Group and Individuals on the Tests of Associative Learning 80
Summary of Findings 80
Schonell's Graded Word Spelling Test 81
Description of the Test 81
Procedure in Testing 82
Individual Results of the Schonell's Graded Word Spelling 83
Group Results of Schonell's Grade Spelling Test ... 83
Comparison of Performances on Schonell's Graded Spelling Test for the Group and Individual Students 83
Summary of Findings 89
Summary of Specific Findings in Each Test Area 89
Sight Vocabulary 89
Word Recognition 90
Oral Reading 90
Silent Reading 91

Letter Names and Sounds 92

Reading Aptitudes 92

Associative Learning 92

Spelling 93

Summary of General Findings 93

Chapter Summary 94

IV. COMPARISONS OF PERCEPTUAL PERFORMANCES OF THE GROUP AND INDIVIDUALS ON SELECTED GROUPS OF TESTS 95

Visual Performance 96

Letters and Letter-like Forms 96

Words and Word-like Forms 98

Visual Memory 99

Summary of Visual Performance 99

Auditory Performance 100

Letter Sounds 100

Auditory Memory 101

Summary of Auditory Performance 102

Kinaesthetic Performance 102

Causes of Difficulty 103

Letter Forms 103

Word Forms 104

Summary of Kinaesthetic Performance 104

Auditory-Visual-Kinaesthetic Performance 105

Recognition of Letters and Letter-like Forms 106

Words and Word-like Forms 108

Summary of Auditory-Visual-Kinaesthetic Performance 111

Comprehension 112

Summary of the Analyses of Perceptual Performances

on the Selected Tests 113

Visual Performance 113

Auditory Performance 113

Kinaesthetic Performance 114

Auditory-Visual-Kinaesthetic Performance 114

Comprehension 115

Chapter Summary 115

V. SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS .. 116

Summary of the Investigation 116

Summary of Findings for Individual Performances 117

Summary of Findings for Group Performances 118

Conclusions 119

Will the Analysis of Test Results Reveal Patterns

of Visual Perception for Individuals? 120

Will the Analysis of Test Results Reveal Patterns

of Visual Perception for the Group? 121

Will the Analysis of Test Results Reveal Patterns

of Auditory Perception for Individuals?......... 121

Will the Analysis of Test Results Reveal Patterns

of Auditory Perception for the Group? 122

Will the Analysis of Test Results Reveal Patterns

of Kinaesthetic Perception for Individuals 123

Will the Analysis of Test Results Reveal Patterns

of Kinaesthetic Perception for the Group? 123

CHAPTER PAGE

The Necessity for Combining Various Perceptual Activities 124

Observations 126

Limitations of the Study 127

Implications and Recommendations for Instruction and Testing 128

Suggestions for Further Research 130

Concluding Statement 132

BIBLIOGRAPHY 134

APPENDICES 138

LIST OF TABLES

TABLE PAGE

I. Overview of Test Population 22

II. Amount of Retardation Based on the Difference Between Mental Age and Schonell Reading Age (Converted) and When Reading Grade is Compared With Grade Expectancy.. 24

III. Percentage of Correct Responses for Each Reader Level .. 32

IV. Types of Responses in Sight Vocabulary and Word Recognition at Eight Reader Levels 33

V. Percentage of Total Errors for the Group in Schonell's Graded Reading Vocabulary Test 38

VI. Individual Scores at Seven Graded Levels of Schonell's Graded Reading Vocabulary Test 40

VII. Reading Ages in Oral Reading as Measured by the Neale Analysis of Reading Ability 47

VIII. Range of Ability and Mean Scores of the Sub-Tests of the Neale Analysis of Reading Ability 48

IX. Comparisons of Types of Errors in Accuracy with the Total Number of Errors in Each Passage 50

X. Types of Word Recognition Performance Compared to Number of Incorrect Attempts 50

XI. Comparison of Comprehension Scores in Silent Reading with Rate in Words Per Minute 55

XII. Comparison of Percentage of Correct Responses to Types of Comprehension Questions 56

XIII. Survey of Performances in Naming and Sounding the Letters 59

TABLE PAGE

XIV. Frequency of Errors in Letter Sounds and the Specific Sounds Which Were Confused 62

XV. Distribution of Aptitude Scores According to Ratings of Inferior, Average or Superior 65

XVI. Distribution of Total Percentile Scores for Each Student in Superior, Average and Inferior Categories.. 65

XVII. Summary of the Percentile Ratings of Each Student on the Sub-Tests of the Monroe-Sherman Reading Aptitude Test 66

XVIII. Comparison of Individual Category Levels in Associative Learning With Mental Grades 78

XIX. Number of Students Who Learned the Series Before Tests Were Completed 79

XX. Distribution of Scores in Associative Learning According to Mean, Low and Very Low Categories 79

XXI. Schonell Spelling Grades Compared with Mental Ages to Show the Amount of Retardation for Each Student ... 84

XXII. Frequency of Correct Responses at Eight Levels of the Schonell's Graded Spelling Test 85

XXIII. Frequency of Spelling Errors as Classified by the Spache Formula 87

LIST OF FIGURES

FIGURE PAGE

I. Profile of Total Results of Aptitude Tests for the Group 67
II. Profiles of Motor Tests of Copying Text and Crossing-Out Letters 69
III. Profiles of Visual Letter Memory and Copying Text 70
IV. Profiles of Auditory Letter Memory and Orientation and Discrimination 71
V. Profiles of Visual Letter Memory and Visual Form Memory 72
VI. Profiles of Auditory Discrimination and Orientation and Oral Vocabulary 74

CHAPTER I

INTRODUCTION

THE PROBLEM

This study will attempt to identify patterns of perceptual performance of a selected group of severely retarded readers and to define these patterns so that they may be recognized as types of behaviour which may indicate difficulty in learning to read.

STATEMENT OF THE PROBLEM

Many children who are retarded in reading have reached the later grades of elementary school or early junior high school before their handicap is recognized. By this time many behavioural characteristics have become firmly established and disabilities have been aggravated, thus making attempts at remediation very difficult.

Studies which deal with reading disabilities often involve the use of elaborate devices and tests for the identification of causes of retardation. Trained clinicians and specialists are usually needed to interpret the results properly. Since these specialists are able to meet only a limited number of children who need help, it is important that classroom teachers have some means of determining the students who may develop reading difficulties unless these children are identified early and instructed by special methods. It is becoming

increasingly apparent that more attention must be given to responses in tests which can be given and interpreted by the teachers themselves.

The motive for this study developed from a survey of the performances on diagnostic tests of retarded readers in the Edmonton Public School System over a period of two years. The available evidence indicated that similar types of behaviour seemed to occur with a considerable degree of regularity in responses to similar test items. The predictability of these responses seemed to be greater with the more severely retarded readers.

The majority of these children had been attending school long enough to have reached later elementary or junior high school grades by reason of their chronological ages. By this time the specialized attention and methods needed to overcome their handicaps were difficult to implement. Many of these students had made negligible reading progress under methods used for classroom group instruction. Apparently, a continuation of the methods of instruction that had been applied in these groups would be of little value to these students. The need of early identification of children with adequate mental capacity who might fail to learn to read under regular classroom conditions was clearly indicated.

A review of the literature dealing with reading retardation revealed that much had been written and studied about possible causes of failure to learn to read. The great majority of these studies had dealt with a single anomaly while others had investigated related factors or groups of factors pertaining to reading retardation. Only

in comparatively recent studies had researchers considered the possibility that any or all of these anomalies might not be a direct cause of the reading difficulty but might be a symptom of it. Johnson (1955) suggested that a pattern of symptoms, as typified by behaviour in certain reading situations, might be a possible identification of future reading difficulties in individual students. Within the past few years several clinical studies have attempted to reveal patterns of performances as indications of reading difficulty. Among these were studies by De Hirsch (1957), and Goins (1958). The only Alberta study which examined patterns of test performance for retarded readers was reported by Dockrell (1960) in which he analysed the profiles of retarded readers on the Wechsler Intelligence Scale for Children for diagnostic purposes. Several studies have made successful use of a case study approach to determine the value of clinical instruction. One of the most thorough of these was conducted by Robinson (1946) in which the findings of highly trained technicians and specialists were used to determine possible causes of reading failure. While all of these studies contributed important information to the complex problem of why some children with adequate mental capacity fail in reading, they all have used methods and resources which are not generally available to classroom teachers.

PURPOSE OF THE STUDY

The present study was undertaken for the purpose of looking for patterns of perceptual performance in the kinds of tests which

may be given and interpreted by teachers and which may be an indication of possible failure to learn to read when the usual group instructional methods are used.

QUESTIONS

The study attempted to find answers to the following questions:

a) Will the analysis of test results reveal patterns of visual perception for individuals?

b) Will the analysis of test results reveal patterns of visual perception for the group?

c) Will the analysis of test results reveal patterns of auditory perception for individuals?

d) Will the analysis of test results reveal patterns of auditory perception for the group?

e) Will the analysis of test results reveal patterns of kinaesthetic perception for individuals?

f) Will the analysis of test results reveal patterns of kinaesthetic perception for the group?

ORGANIZATION AND PROCEDURE

In an effort to search for patterns of behaviour the study involved the following tasks:

a) The administration of a battery of selected tests

b) An analysis of the results of group and individual performances as revealed by the following comparisons:

(1) A comparison of performances of individuals and the group within each separate test

(2) A comparison of performances of individuals and the group among selected tests

The data were secured from the members of the two Adaptation Classes of the Edmonton Public School System. These classes were composed of the twenty-three most severely retarded readers within the ages of ten to fifteen years who had been segregated into the two special classes for remedial help. Children eligible for these classes had been screened by the Visiting Teachers of the Special Services Division of the Edmonton Public School Board from among a large group of referrals from teachers and principals of city schools. These pupils were given either the Revised Stanford-Binet Intelligence Test or the Wechsler Intelligence Scale for Children in an effort to ascertain individual intelligence quotients. Each child's achievement on the California Reading and Arithmetic tests was compared with learning capacity. The twenty-three children with the largest discrepancy between present achievement and capacity were placed in two special groups called Adaptation Classes. Since these children were identified as being severely retarded in reading when the initial screening for placement in the Adaptation Class had been carried out, no further identification of this nature was considered necessary. The study proceeded directly into a testing program designed to measure behaviour in situations related to reading.

To accomplish this a group of tests was selected and adapted to measure performance in certain areas of reading, vocabulary, spelling, and aptitude for learning. Some of these were administered as group tests but the majority were given individually. The results of each of these tests were analysed for group and individual performances and selected tests were then compared in an effort to search for patterns of group and individual behaviour which might be used to predict performance in learning to read.

ASSUMPTIONS

The tests were administered to a group of children of adequate mental capacity each of whom had demonstrated his inability to learn to read when instructed by the usual group methods. The assumption was made that patterns of perceptual behaviour exhibited by these students had been present before instruction in reading had been given. A further assumption was made that similar patterns of perceptual behaviour, if found in other children of adequate mental capacity, could be used as predictors of difficulty in learning to read if instruction were confined to the usual group methods.

LIMITATIONS OF THE STUDY

As outlined previously, the method used for this study had a number of limitations. The first of these was the fact that only the perceptual performance of extremely retarded readers was considered. Because a comparison of types of performance was the purpose of the study, no control group was used. Physical disabilities of all types

were disregarded even though it was known that some or all of the students had multiple limitations which included a number of physical anomalies. Mental retardation was eliminated as a factor by the choice of population because an important criteria for admission to the Adaptation Classes was a normal or above normal intelligence as measured by an individual intelligence test.

All the children in the test classes had been exposed to group methods of reading instruction. In addition, several of them had received varied amounts of individual tutorial assistance. One Adaptation Class had been organized in 1960 and a second the following year. Because of this, twelve members of the group had been in the special class setting for eighteen months as compared to ten months for the remaining eleven students. As a result, perceptual patterns had become established to different degrees and by different instructional methods.

SIGNIFICANCE OF THE STUDY

Many studies which dealt with the discovery of causes of reading difficulty and which tested the results of various anomalies on reading performance, were reviewed. Though several of these studies mentioned possible patterns of performance which might be present, few investigated the significance of patterns of performance in achievement and aptitude as a predictor of future reading performance.

Many compared results, but not performance, on specified test items. Authorities have indicated the need for research which analyses performance rather than total test results. (Smith, 1961), (A. Robinson, 1962).

When children have become so retarded in reading that their distress is apparent it is often too late to give corrective treatment. Much needs to be learned about the performance of these children before they become so severely retarded that they are unable to function in the classroom situation. This study was designed to explore the possibilities of using patterns of perceptual performance for this purpose.

CHAPTER II

RELATED STUDIES

Perceptual development is a major factor in determining reading achievement. Through perception the graphic symbols attain meaning. Smith (1961, p. 23) in his discussion of the perceptual process states:

> In reading, an adequate response demands much more than the mere recognition of the meaning of the configuration of the written word. It requires interpretation through some mediating process that can utilize whatever we see, taste, hear, smell, touch -- everything to which we react through our senses.

Of these perceptual factors some are more directly concerned with the reading act than others -- namely, those which involve visual, auditory and kinaesthetic behaviour. These more obviously related factors have received the most attention from researchers. It is towards behaviour in these areas that this study is directed.

During the past forty years many theories regarding possible causes of reading disability have been proposed. Studies made during this period have tended to follow a trend which changed in emphasis as attempts were made to prove or disprove each new theory. For the purpose of this study, research dealing with visual, auditory and kinaesthetic perception was reviewed. Also included were examples of studies which illustrated changes in the type of treatment given to research evidence during the past two decades. Because many of the studies tended to concern themselves with the particular theory which prevailed

at the time of writing much repetition was apparent. Accordingly, research reviewed in this chapter was selected for its significant contribution to, or illustration of, each chosen area of perceptual ability as it related to reading.

VISUAL PERCEPTION

The most extensive body of research dealing with perceptual factors related to reading ability was concerned with visual perception. In 1922, Gates (1922) initiated one of the first investigations of importance with a series of studies which attempted to measure the extent to which results of tests of visual perceptual abilities were related to reading achievement. In a series of eight tests he measured the ability to distinguish between pairs of similar and different items which included real words, nonsense words, geometric figures and digits. In a search for the presence or absence of a general visual perceptual ability Gates obtained intercorrelations among the eight tests. Because all of these intercorrelations were low Gates concluded that visual perceptual ability was specific rather than general for certain items. When the test results were correlated with tests of reading and spelling it was discovered that the ability to perceive likenesses and differences between geometric figures seemed to have no association with reading or spelling but a similar test which used words showed a fairly high correlation.

Later studies tended to disprove the conclusion that there was no general perceptual pattern. However, many studies showed that where actual or approximated letters and words were used as test items,

correlations with reading and spelling were high. Sister Mary of the Visitation (1929) and Sister Mary Phelan (1940) agreed in their studies that practice in visual discrimination of material other than letters or words appeared to have little relationship to improvement in either reading or spelling. Stroud (1945) pointed out the possibility that this was due to practice with letters and words rather than to differences in innate ability.

A more recent study by Vernon (1957) stressed the developmental nature of visual perceptual abilities. Difficulties with orientation and order were discussed as a tendency of backward readers.

The studies mentioned in this section are only a representation of a vast amount of research which dealt with visual perception as it related to reading. Most of these studies however, failed to relate visual perception to other perceptual fields. Only in comparatively recent studies has mention been made that visual perception must be followed by some manipulatory act to complete the transfer to reading. Goins (1958, p. 25) referred to a study by Renshaw (1945) in which the effects of tachistoscopic training on beginning reading progress was assessed. With regard to perception which followed the rapid exposure of visual forms Goins quotes Renshaw's assertion that, "Exposure of forms is, in itself, not enough. -- The trainee must be trained to grasp the total impression, to fix it in mind by the immediate motor consummation of speaking, writing, drawing, mimicking, or some other form of manipulatory response."

AUDITORY PERCEPTION

A smaller number of studies have dealt with auditory perceptual

abilities. Monroe (1932) demonstrated that some, but not all, children who are retarded in reading are decidedly handicapped in auditory perception of sound patterns. Schonell (1942, p. 173) stated that weakness in auditory perceptual abilities is one of the most important and frequently recurring causal factors in reading disability. He attributed failure in auditory discrimination to delayed maturation. Bond (1935) found that auditory perceptual difficulties were more frequent among poor readers than among good readers. He discovered that among those taught by an auditory (phonetic) method, differences were even more significant. Vernon (1957) gave considerable emphasis to the association of auditory perception and reading difficulties. Its particular association with a phonetic teaching method was described in detail.

As with the studies discussed in the section dealing with visual perception the majority of those relating auditory perception to reading ability failed to consider the interaction of other perceptual fields with auditory perception. A majority of studies in this area related difficulties in auditory perception to teaching methods. Only two studies, both of which were made over twenty years ago, made mention of patterns of difficulty in the auditory aspects of reading. Monroe (1932) described types of errors in sound blending as being a significant diagnostic technique. Betts (1940, p. 46), in his study of reading problems of intermediate grade students, mentioned a similarity of patterns in the audiograms of six below average readers who had hearing losses. No further significance was attached to this observation.

Robinson (1946) concurred with the findings of a positive

relationship between auditory discrimination and reading ability but was not satisfied that adequate testing in auditory perception had yet been carried out. Many of these studies did not differentiate between auditory acuity and auditory perception even though most of them failed to find a significant relationship between auditory acuity and reading ability.

KINAESTHETIC PERCEPTION

Few studies have attempted to relate reading difficulties and kinaesthetic recognition. Monroe (1932, p. 99) in her study of children who have reading difficulties noted some individuals who had a marked disability in the motor control necessary for reading. This manifested itself in the inability to follow the lines of words with the eye or finger, indistinct speech caused by clumsy movements of the speech organs and ill-formed writing. In this study, motor precision, although it was noted, was not measured.

Most of the studies concerned with kinaesthetic behaviour have treated it as a device for reinforcing visual and auditory imagery. Gates (1947), Schonell (1942), and Harris (1947) all advocated the use of tracing or writing used in this way. Kirk (1940) found that the tracing method, when added to other word recognition techniques, resulted in better recall and speedier relearning. In this study, only recognition of word forms rather than word meaning was considered. Schonell (1942, p. 278) expressed the opinion that the "additional stimulus of movement enables pupils to experience the 'feel' of the word from left to right, the natural method of perception." He further

stated, "There is a tendency in the teaching of both reading and spelling to neglect the kinaesthetic impression of words, and to spend most time over their visual and auditory forms." One of the most notable studies which connected kinaesthetic performance with reading ability was made by Fernald (1943). Her famous method of remedial teaching for those students who were naturally deficient in visual and auditory imagery is still one of the best known of this group. More recently, studies dealing with difficulties of kinaesthetic perception have related it to neurological malfunctions.

The investigation by Renshaw (1945), previously mentioned in this study, was one of the first to recognize that kinaesthetic response was a necessary follow-up to visual perception as it applied to reading. In a recent Alberta study by Glennon (1961), which investigated the relationship of speed of motor performance and reading achievement, the investigator also realized the importance of motor response to other perceptual areas. No other Alberta study was found which examined types of kinaesthetic performance as they related to reading ability.

TRENDS IN RESEARCH

The trend in types of studies which have attempted to relate the various perceptual fields to reading disabilities has changed several times during the past forty years of research. During the early part of the century a number of studies attempted to examine the behaviour of underachievers in a clinical situation. Typical of these

was Van Alstyne (1923) who studied ten gifted children whose school progress was unsatisfactory. An attempt was made to determine individual difficulties but unfortunately the researcher did not make use of the findings in her final conclusions.

Following this period the emphasis was focussed on a search for causes of failure. Many of these dealt with one aspect of performance or one cause of difficulty. Some of the most widely quoted of these were the studies of visual perception by Renshaw (1945) and the studies of auditory aspects of reading by Wepman (1960). Many of these studies which dealt with selected factors pertaining to reading disability were prejudiced because of a particular interest. Many of them overemphasized the importance of isolated factors as major causes of disabilities.

A change in the trend of types of studies came with the realization that reading difficulties were the result of a composite of related conditions rather than a single cause. Representative of this group was Monroe (1932). Reference to multiple causation was made by many other authors and researchers, among them Bond and Tinker (1957) and Vernon (1957).

The realization that reading difficulties were not only the result of a multiplicity of causes but that these causes varied with individuals moved the trend back to the study of retarded readers not only in terms of group behaviour but in terms of the behaviour of individuals in the groups. Robinson (1946) worked with a group of specialists to make a survey and appraisal of possible causes of seri-

ous reading retardation. Thirty seriously retarded readers were investigated for causal factors and each case was evaluated in terms of the findings of the various specialists. The incidence of each separate finding was tabulated so that each factor could be classified as causal or coincidental for the group. Unlike earlier clinical studies, recommendations for treatment were prepared for each student based on individual behaviour patterns.

Recent research has tended to follow the trend set by Robinson's widely quoted study in searching for patterns of behaviour in reading disability.

In 1955 Johnson in an attempt to improve the program of instruction at the Temple University Reading Clinic made an analysis of thirty-four selected cases of students with reading disability in attendance at the clinic. A case study for each child included the results of various achievement and learning tests at the time of entry into the clinic. When findings for the group were compiled and analysed the cases seemed to have some characteristics in common. Of interest to this study were the following patterns as revealed by the analysis:

a) The children were of normal age for completion of elementary school before clinical help was sought.

b) Factors other than limited intelligence were operative in causing the reading disability.

c) Deficiency in memory span was the most outstanding characteristic of behaviour.

d) The most apparent learning difficulty was the formation of associations with word-like figures when all stimulation was visual.

No control group was used as a basis of comparison therefore the significance of these findings was not determined. However an earlier study by Stauffer (1947) had investigated the relationship between associative learning and general capacity of retarded readers. He concluded that: retarded readers tend to achieve significantly higher scores by a visual-auditory mode of presentation than by a visual-visual, and that significantly higher scores were made by retarded readers on geometric test targets than on word-like test targets. These findings may indicate that the child with a specific reading disability may have difficulty in learning to associate meaning with visual symbols and particularly with word forms.

Johnson (1957) made an extensive study of factors related to disability in reading in children of normal or superior intelligence in which she concluded that many factors which had hitherto been regarded as causes of reading disability may in reality be symptoms related to a common cause. She noted that certain patterns of behaviour tend to characterize severely retarded readers but criticized many of the previous studies for lack of evidence that similar patterns of behaviour were not also present in achieving readers. A recent study by Robeck (1962) typified the trend towards observation of behaviour in an approach to a systematic investigation of causal factors in reading disability. This study, as in several previously noted studies, also used a detailed

examination of clinical files, the results of questionaires, interviews, formal and informal tests to determine the order of frequency of factors associated with reading difficulties. H. Alan Robinson (1962, p. 62) in speaking to the International Reading Association Conference, said, "There is increasing awareness of the concept that the base must be broadened -- that diagnosis of reading failure goes beyond the measurement of reading achievement alone." Robinson (p. 64) further states, during the discussion cited above, that, "Children may achieve similar gross scores or levels and differ markedly in specific skill areas. The individual, his specific cluster of needs, and a suggested program of treatment must be considered in any diagnostic procedure of significance."

SUMMARY

The cycle of studies which attempted to add to the knowledge of the causes of reading failure has developed through the years from a study of individual problems, has progressed through many investigations of isolated causes, and related groups of causes and is presently concentrating again on the reading behaviour of individual students.

When recent studies of groups of retarded readers are compared with some of the early studies in this area the influence of the intervening research is clearly seen. Anomalies which had formerly been considered significant as a cause of reading disability were now found to be less closely related to failure in this area. Other prevailing factors were found to be significant for certain students but not for

others. The awareness of the extent of the inter-relationship of the many factors involved in reading retardation was becoming increasingly apparent. This view was expressed as follows:

"Perhaps an even greater need is to develop our diagnostic techniques so as to identify syndromes -- those signs and symptoms that occur together and through whose pattern we may recognize a specific problem." (Smith and Dechant, 1961)

This study has attempted to search for such syndromes in an effort to identify patterns of reading behaviour.

CHAPTER III

DESCRIPTION OF PROCEDURE

This chapter describes the procedures which were followed in formulating this study in terms of (a) research population (b) areas which were tested (c) nature of the tests (d) methods of administration and analysis of each test (e) results of the analysis of each test (f) comparison of the results (g) summary of the findings.

RESEARCH POPULATION

The subjects chosen for this study were the twenty-three members of the Adaptation Classes of the Edmonton Public School System. These boys and girls had been taken from their regular classes and grouped for special instruction in all school work in the hope of eventually returning them to a regular routine. The criteria for enrollment in these special classes were as follows:

a) an age which fell between nine and fourteen years;

b) a history of continued failure in regular classes;

c) an average or better range of intelligence as measured by an individual test;

d) a wide discrepancy between actual achievement and potential achievement.

These children were originally referred to the Special Education Department of the Edmonton Public School System by school principals because of consistent failure to respond to regular classroom instruc-

tion. All had histories of extreme retardation in academic work. Possible candidates for these classes were retested on the California Achievement Test, Elementary Level, Form W, 1957 Edition, Reading and Arithmetic sub-tests, which is regarded as a highly reliable instrument for measuring and evaluating school achievement. Since it had four equivalent forms it was felt that this same test could be used to measure progress not only at the end of the term but at the beginning and end of a second term if one were necessary. It was especially useful for use with severely retarded readers because the grade placement begins at 1.5, was graduated in months and was equated to subject, educational or chronological age. The final population was composed of the twenty-three subjects chosen from a total of approximately one hundred who showed the greatest discrepancy between capacity and actual attainment. One class was started in 1960 and a second in 1961. These were composed of a junior class of eleven students and a senior class of twelve students. At the time of testing, eighteen months of special instruction had been given to the senior class and eight months to the junior class. The senior and junior designation was not given with reference to chronological age because there was a considerable amount of overlapping in individual ages.

The first group, established in 1960, consisted entirely of twelve boys. The second group, started the following year, consisted of three girls and eight boys.

An overview of the total test population at the time of testing for this study is shown in Table 1. Reference to this table showed that the mean age of the junior class was 13.3 with a range of eleven years

TABLE 1

OVERVIEW OF TEST POPULATION

Case Number	Sex	Chronological Age	Mental Age	I.Q.	
1	M	12 - 4	13 - 3	*W	108
2	M	12 - 5	13 - 3	W	107
3	M	14 - 4	15 - 5	W	108
4	M	12 - 1	14 - 3	S	120
5	M	15 - 2	14 - 10	S	98
6	M	13 - 2	11 - 11	S	91
7	M	11 - 10	12 - 9	W	108
8	M	14 - 3	13 - 3	S	93
9	M	14 - 11	14 - 2	W	95
10	M	12 - 1	14 - 4	S	119
11	M	12 - 6	14 - 7	S	117
12	M	14 - 11	15 - 9	S	106
13	M	14 - 11	13 - 1	W	88
14	M	14 - 4	16 - 0	S	112
15	F	12 - 9	13 - 3	W	104
16	M	11 - 7	12 - 6	W	108
17	M	13 - 9	12 - 6	W	91
18	F	13 - 4	12 - 4	W	93
19	F	14 - 10	14 - 11	W	101
20	M	11 - 4	12 - 4	W	109
21	M	12 - 1	12 - 2	S	101
22	M	14 - 2	13 - 10	W	98
23	M	13 - 0	11 - 5	S	88
	Mean	12 - 4	13 - 6		
	Median	13 - 2	13 - 3		

Range: Chronological Age 11 - 4 to 15 - 2 (3.8 years)
Mental Age 11 - 5 to 16 - 0 (4.5 years)

* S = Stanford Binet
W = WISC

and four months, to fourteen years and eleven months while that of the senior class was thirteen years and four months with a range of eleven years and ten months to fifteen years and two months.

All of the students enrolled in the classes were within or above the normal range of intelligence. Two of the chosen subjects had intelligence quotients of eighty-eight as measured by the Stanford-Binet and Weschler Intelligence Scale respectively. Though this was slightly below ninety, which is usually designated as the lower level of the normal range of intelligence, both of these subjects were chosen because there was some doubt that this score was a valid indication of their true ability. In the classic study by Robinson (1946), which made use of extremely detailed case studies of thirty children in an effort to extend understanding of the causes of severe reading disability, one of the requirements for acceptance was that "the child have an intelligence quotient on the New Stanford-Binet of at least eighty-five, thus eliminating the most serious cases of mental retardation and insuring intellectual readiness for reading." (Robinson, 1946, p. 107)

Although the final choice of candidates for these special classes was not entirely dependent on the reading grade this was the most important criteria. In all cases, regardless of the amount of special instruction which had been given, lack of reading achievement was the major factor in the retardation. Table 2 shows the amount of retardation when mental age and grade expectancy are compared with reading age and reading grade as measured by the Schonell Graded Reading Vocabulary Test. It will be noted that all but one of the students

TABLE 2

AMOUNT OF RETARDATION BASED ON THE DIFFERENCE BETWEEN MENTAL AGE AND SCHONELL READING AGE (CONVERTED) AND WHEN READING GRADE IS COMPARED WITH GRADE EXPECTANCY

Case Number	Mental Age	Reading Age (Schonell)	Reading Grade (Converted)	Grade Expectancy	Amount of Retardation (Years)
1	13 - 3	9 - 8	4.8	8.3	3 - 7
2	13 - 3	9 - 0	4.0	8.3	4 - 3
3	15 - 5	8 - 6	3.6	10.5	6 - 11
4	14 - 3	9 - 0	4.0	9.3	5 - 3
5	14 - 10	8 - 1	3.1	9.10	6 - 9
6	11 - 11	7 - 1	2.1	7.1	4 - 10
7	12 - 9	8 - 1	3.1	7.9	4 - 8
8	13 - 3	8 - 0	3.0	8.3	5 - 3
9	14 - 2	8 - 6	3.6	9.2	5 - 8
10	14 - 4	6 - 7	1.7	9.4	7 - 9
11	14 - 7	9 - 1	4.1	9.7	5 - 6
12	15 - 9	9 - 8	4.8	10.9	6 - 1
13	13 - 1	7 - 2	2.2	8.1	5 - 11
14	16 - 0	10 - 0	5.0	11.0	6 - 0
15	13 - 3	7 - 10	2.10	8.3	5 - 5
16	12 - 6	8 - 5	3.5	7.6	4 - 1
17	12 - 6	7 - 6	2.6	7.6	5 - 0
18	12 - 4	10 - 0	5.0	7.4	2 - 4
19	14 - 1	8 - 11	3.11	10.1	5 - 2
20	12 - 4	7 - 1	2.1	7.4	5 - 3
21	12 - 2	6 - 2	1.2	7.2	6 - 0
22	12 - 5	9 - 2	4.2	7.5	3 - 3
23	11 - 5	7 - 7	2.7	6.5	3 - 10
	Mean	8 - 3	5.1		
	Median	8 - 5	5.3		

Reading Age: Mean -- 8 years 3 months Median -- 8 years 5 months

Amount of Retardation: Mean -- 5 years 1 month Median -- 5 years 3 months

has a grade expectancy of either junior or senior high school level.

For this group, no attempt was made to take into consideration possible causes of failure. Only the fact that the child had failed to make progress under normal classroom conditions was considered. It was felt by the committee which selected the classes that the groups were small enough so that each child could have sufficient individual attention to compensate for possible physical anomalies. Some of these abnormal physical conditions had already been reported by the Medical Department. Several of the children exhibited evidence of neurological difficulties as a result of electro-encephalographic examinations given by the Guidance Clinic of the Province of Alberta. Emotional problems had been noted by Visiting Teachers from the Special Services Department and, in several instances, by psychiatrists from the Provincial Guidance Clinic and the University Education Clinic.

Tests to determine the initial placement of students in the classes had been given by the Visiting Teachers of the Special Services Department. Intelligence quotients had been established by the Stanford-Binet or the Weschler Intelligence Scale for Children. Each child was given the reading and arithmetic sub-tests from the California Achievement Test, Elementary Level. The average of the reading and arithmetic scores was compared with the chronological age and intelligence quotient. In 1960 fifty-six children were tested from which cases numbered from one through twelve were chosen. In 1961, eleven children were chosen from fifty-four possible candidates. These were the cases numbered from thirteen through twenty-three. For purposes of this study these two classes will be designated as one group.

AREAS WHICH WERE TESTED

Since the purpose of the study, as indicated in Chapter I, was to search for patterns of behaviour which could be noted in other children who were having difficulty in learning to read, it was decided to use the same battery of tests which the examiner was in the habit of using when diagnosing reading difficulties throughout the school system.

The following areas were tested:

-- sight vocabulary
-- word attack skills
-- rate, accuracy and comprehension in oral reading
-- rate and comprehension in silent reading
-- knowledge of letter names
-- knowledge of letter sounds in isolation
-- reading aptitude in
    visual letter memory
    visual form memory
    auditory letter memory
    orientation and discrimination
    hand-eye coordination
    oral vocabulary
-- associative learning
-- spelling

The achievement tests and disability analysis arising from the examination of pupil behaviour on these tests were similar in scope to

areas which were included in the diagnostic batteries assembled by such noted diagnosticians as Monroe (1932), Gates (1947) and Schonell (1950). All of these included diagnostic oral and silent reading tests; all measured sight vocabulary and word analysis skills. Gates noted the ability to name and sound letters as an auditory-visual technique. Because of the close relationship between reading and spelling skills and because phonic training often involved spelling activities, all of these programs included a diagnostic measure of spelling ability.

Both Monroe and Gates included some measure of auditory-visual associative learning ability. Stauffer (1947) and Johnson (1957) had both suggested the value of this type of test for its predictive value. Though associative learning tests were not usually given by teachers, such a test was included so that its possible value as a type of readiness test could be ascertained.

Reading aptitude as such was not included in any of the batteries which were examined but many of the areas which were termed "aptitude" in the Monroe-Sherman Reading Aptitude Test were included in all of the well-known diagnostic plans. Since the Monroe-Sherman test was designed for use with a group and could be administered by teachers, it was included as an aid to the determination of each individual's method of learning.

TESTS AND TESTING PROCEDURES

The following tests were used to determine visual, auditory and kinaesthetic perceptual performance:

Temple University Inventory of Sight Vocabulary and Word Recognition Skills

Schonell's Graded Reading Vocabulary Test

Neale Analysis of Reading Ability Form B - Oral

Neale Analysis of Reading Ability Form A - Silent

Neale Supplementary Diagnostic Test I

Monroe-Sherman Diagnostic Reading Aptitude Test

Gates Associative Learning Tests

Schonell's Graded Word Spelling Test A

Tests for this study were administered in the months of April and May, 1962. The investigator administered all tests except the Schonell Graded Spelling which was dictated by the teachers of each class.

Of the tests used, all had some form of standardization except sight vocabulary, knowledge of letter names, knowledge of letter sounds and rate and comprehension in silent reading. However, although test norms were used whenever these were supplied, this was only one basis of comparison. Total scores and item analyses were major sources of material for the investigation.

TEMPLE UNIVERSITY INVENTORY OF SIGHT VOCABULARY AND WORD RECOGNITION SKILLS

Description of the test

Two tests were combined so that sight vocabulary and timed word recognition skills could be checked at eight different reader levels. Pre-primer, Primer, First Reader, Second Reader and Third Reader lists were contained in the Individual Word Recognition Test prepared by the

Reading Clinic, Department of Psychology, Temple University. The words are based on Betts' Reading Vocabulary Study. The Word Recognition Skills Inventory from the College Reading Service, Temple University, was used to test grades four, five and six levels. This list was sampled from the Durrell-Sullivan reading vocabularies derived from word counts of books commonly used in each of the above grades.

These two tests were combined to become an inventory of sight vocabulary and rapid word recognition skills[1] as follows:

Pre-primer -- 15 words
Primer -- 20 words
First reader -- 20 words
Second reader -- 20 words
Third reader -- 25 words
Fourth reader -- 20 words
Fifth reader -- 20 words
Sixth reader -- 20 words

A total of one hundred words from five reader levels was included in the primary material and sixty words from three reader levels was used to check the vocabulary at the secondary level. These tests were especially valuable because when administered in sequence they gave an indication of the grade levels at which sight vocabulary was not functional. This inventory was not a complete check of a child's sight vocabulary but, rather, a sampling which suggested the level at which rapid techniques of word recognition were not being applied.

---

[1] Permission was obtained to use the tests in this manner from Dr. Marjorie Seddon Johnson, Temple University.

Procedure in Testing

In all cases this inventory was used as a power test and all subjects were given an opportunity to attempt all levels. The words were flashed and both refusals and incorrect attempts were recorded -- the latter phonetically. Records were compiled of group and individual performances on the total errors, total errors for each reader level, types of errors for the total group and types of errors for each individual. Since it was not the purpose of this survey to record only correct or incorrect responses to each item, the specific nature of each child's responses was also recorded. An item analysis of each performance was made to determine the number of refusals, correct responses and total errors.

Each error was examined further to determine the type of response made by each child to sight words under timed conditions. The totals of the following types of errors were noted:

-- substitution of nonsense words;

-- substitution of an incorrect vowel sound;

-- the number of errors in which a beginning letter similar to that of the original word was used;

-- the number of errors in which a similar ending letter was used.

Because it was apparent that the majority of errors were centered in the latter parts of words rather than in the beginning parts, word endings and suffixes were given a more detailed analysis than either prefixes or beginning letters.

Individual results of the test of sight vocabulary and word recognition skills

When the individual results of the test of sight vocabulary and word recognition skills were examined it was noted that only fourteen of the twenty-three students were able to recognize at sight all the words of the pre-primer sample. At the primer level only two students had perfect results. No students achieved perfect individual totals past the primer level.

Since the number of years in school would presumably affect the number of opportunities which each student would have to become familiar with skills of words recognition and sight vocabulary, a comparison was made of the percentage of correct responses for each reader level with the number of years in school for each student. These results are shown in Table 3. An examination of this table shows that the number of years in school did not appear to have affected the ability to recognize primary sight words to any great extent. However, speed and accuracy of word recognition skills at the division two level seemed to be slightly higher for those students who had been in school for more than seven years. Four members of the group (students 10, 11, 20 and 21) attempted no words past the fourth reader level.

Group results of the test of sight vocabulary and word recognition

Types of responses to the test of sight vocabulary and word recognition are shown in Table 4. It will be observed that the group as a whole made errors at every level including pre-primer. In the

TABLE 3

PERCENTAGE OF CORRECT RESPONSES FOR EACH READER LEVEL

Case No.	Pre-Primer	Primer	1st Read.	2nd Read.	3rd Read.	4th Read.	5th Read.	6th Read.	Number of Yr. in School
1	100	100	95	80	84	45	50	10	5 - 8
2	87	90	85	75	80	55	40	0	4 - 8
3	100	90	85	80	60	35	25	10	4 - 8
4	100	85	90	80	88	40	32	28	5 - 8
5	100	80	95	70	68	25	25	20	9 - 8
6	100	65	80	50	40	10	15	0	7 - 8
7	87	85	95	70	56	25	10	0	4 - 8
8	100	100	90	45	56	25	35	0	6 - 8
9	100	95	85	85	76	35	20	40	9 - 8
10	88	60	55	20	16	0	0	0	6 - 8
11	93	75	70	60	40	5	0	0	5 - 8
12	100	90	90	80	80	55	60	45	9 - 8
13	100	85	65	55	45	20	10	0	9 - 8
14	100	80	90	65	85	50	25	40	9 - 8
15	100	70	90	70	64	25	15	15	7 - 8
16	100	90	95	80	92	40	10	20	4 - 8
17	100	85	80	50	40	15	15	0	8 - 8
18	92	90	90	55	72	35	25	30	8 - 8
19	100	75	85	80	80	50	50	20	9 - 8
20	93	85	70	50	35	5	0	0	4 - 8
21	78	45	45	15	0	0	0	0	5 - 8
22	92	90	90	85	96	45	35	25	8 - 8
23	93	85	75	60	48	15	10	0	7 - 8

section of the test which checked sight vocabulary at primary grade levels, words which would normally be learned by sight by the time the second reader has been completed seemed to present the greatest difficulty. Almost half of these words were not recognized at sight by the

TABLE 4

TYPES OF RESPONSES IN SIGHT VOCABULARY AND WORD RECOGNITION AT EIGHT READER LEVELS

	Pre-Primer	Primer	1st Read.	2nd Read.	3rd Read.	4th Read.	5th Read.	6th Read.
Total Errors	18	74	70	149	179	190	162	111
Total Refusals	1	3	9	27	59	100	162	249
Percentage of Similar Beginnings	77.7	74.3	81.7	78.2	92.7	89.4	96.9	92.7
Percentage of Similar Endings	44.4	28.3	45.7	46.3	30.7	54.7	47.5	50.4
Percentage of Vowel Errors	33.3	39.1	21.4	28.1	42.4	26.3	31.4	29.7
Number of Nonsense Words	0	0	0	7	9	48	58	57

group. The results at third reader level improve to the extent that only one-third of the total number of words for this level were unrecognized. The difficulty with the second reader sample may have been caused by a greater similarity in configuration of the words in the list. Some of the words in the third reader sample had more variety in length and general configuration. This seemed to aid speed and accuracy of word recognition for many of the students.

Comparison of results of group and individual performances on the test of sight vocabulary and word recognition skills

When types of errors made by the group at each reader level were examined it was noticed that the types of substitutions made for the original words in the lists varied with the reader levels. All

substitutions made in the first three levels (pre-primer, primer and first reader) were meaningful words. It was not until the fourth level (second reader) that nonsense words began to appear. As the words became less familiar and more complicated in form at the division two levels, the proportion of nonsense words as compared to meaningful substitutions increased sharply. This increase in proportion is shown in Table 4. It seemed that many of these students, when confronted with the task of rapid recognition of words beyond those of the primary levels, tended to treat these words as meaningless groups of letters rather than meaningful units.

Other types of errors were peculiar to the primary levels. Among these were several examples of associative errors, as:

you -- we
pretty -- beauty

Also noticed were a number of incidents of substituted words which, though meaningful, bore no resemblance in visual form to the original word in the list, thus:

little -- one
came -- knew

Though these incidents were numerous enough to be noticeable the reason for them was not immediately apparent. There was a possibility that they were a type of associative error.

At the beginning levels the most widely used method of word attack was a combination of the beginning letter or letters combined with configuration. As was previously mentioned, the resultant word, though incorrect, was meaningful. Also in evidence were a number of examples of dependence upon configuration without the use of the

beginning sound. This resulted in such substitutions as:

why -- they
than -- when

As the words became less familiar at the division two level (fourth, fifth, and sixth readers) a change in type of performance in word recognition skills appeared. At this level the group tended to pay more attention to the beginning letter or syllable than they did to the word as a whole. There was much more reliance on the use of phonics which often resulted in nonsense words. Because the test was timed many attempts at pronunciation proceeded no farther than the first syllable. The following examples were typical of division two errors:

in -- introduce
coop -- cooperation
indest -- indeed
disternce -- distress

At all reader levels the beginning letter or letters was the most consistently correct part of attempted words. Reference to Table 4 will show the high proportions of the successful use of this skill. In a large proportion of attempts, the skill was extended to include not only the beginning letter but the prefix where such a syllable was included in the word.

In contrast to the large proportion of correct beginnings were the comparatively few correct endings. Errors in word endings were caused by substitutions of different endings which were not in the original word and endings which were omitted. The greatest number

of errors were the result of substitutions, often meaningless, of the latter parts of words.

Errors in vowel sounds were made in twenty-six percent of the attempts. If more than one vowel error was made in a single word the total number of errors was counted. The proportion of vowel errors was unexpectedly low in comparison to other types of errors. This may be accounted for by the fact that many of the attempts at pronunciation only resulted in a partial word. If time had allowed the students to finish each word it is possible that the number of vowel errors would have been greater.

Summary of findings

The most noticeable feature of the performance in sight word recognition at all levels was the proportion of correct beginnings which were used in the recognition of words in a timed situation. Also noteworthy was the fact that many students in the test group appeared to be unable to attend to word attack and word meaning at the same time. When the words were familiar enough to be perceived at a glance meaning seemed to be of the greater importance, so that even though the words were mispronounced they were meaningful. As soon as the words became less familiar and rapid perception more difficult nonsense words often resulted. When a choice between pronunciation and meaning had to be made, meaning became less important.

SCHONELL'S GRADED READING VOCABULARY TEST

Description of the test

In order to test power and facility in word recognition in an untimed situation the Schonell's Graded Reading Vocabulary Test was administered. This test was standardized in Britain. Although no standardization could be discovered for Alberta students, the test is extensively used in remedial and clinical work in the Alberta Guidance Clinic and the University of Alberta Reading Centre. This test consisted of one hundred words arranged in order of increasing difficulty from first through tenth grade. The words were scientifically selected so that an estimate of a pupil's power of word recognition could be made in terms of the number of errors made. From this estimate Reading Age and Grade were calculated. (Schonell, 1950, p. 38)

Procedure in testing

Because this test was administered according to the publisher's directions it was possible, when analysing results, to use age and grade norms as supplied in the test manual. In addition, it was used as a power test so that a larger sampling of responses could be obtained for the identification of possible patterns of performance. Pupils were allowed as much time as they required to analyse and blend phonetic and structural elements in their attempts to pronounce words in the list. Results of each incorrect attempt were recorded phonetically, thus enabling types of errors to be identified. When the suggested limit of ten successive errors had been reached each pupil was encouraged to attempt any of the remaining words which he felt he might recognize. Results from this test were supplied in years and tenths of a year. For purposes

of comparison with other tests this was converted into years and months. (Schonell, 1950, p. 41)

In this test, as in the timed test of word recognition, individual items were analysed for numbers of refusals, and correct responses as well as for total errors. A further analysis was made of the types of performance in beginnings and endings of words and in the use of vowels. Substitutions of nonsense words were also noted. Since a large number of errors occurred in word endings a detailed examination was made of these word parts. Table 5 lists the results of an examination of the following types of errors:

-- total errors,

-- total refusals,

-- beginning errors,

-- ending errors,

-- total nonsense words,

-- total vowel errors

TABLE 5

PERCENTAGE OF TOTAL ERRORS FOR THE GROUP IN SCHONELL'S GRADED READING VOCABULARY TEST

Level	Total Errors	Total Refusals	Total Nonsense Words	Vowel Errors	Beginning Errors	Ending Errors
1	7%	0	0	41%	11%	47%
2	9%	0	0	52%	0	76%
3	32%	8%	31%	48%	8%	51%
4	54%	8%	36%	48%	4%	52%
5	33%	33%	58%	34%	3%	48%
6	36%	48%	57%	45%	4%	20%

Only the first sixty words were included in the results because attempts beyond this level were too few to warrant recording. Since the test was graded, these sixty words were representative of vocabulary and word attack skills encountered in reading material of the first six levels.

The *Schonell Graded Reading Vocabulary Test* does not assign the test words to any particular grade level. However, comparisons with other tests were required at various achievement levels. Because the one hundred test words were graded in order of difficulty through ten grade levels, each successive group of ten words was considered as a level. These successive levels were designated in this discussion as one through ten.

Individual results of the test of word recognition

Individual results, as recorded in Table 6, showed a wide range of word recognition skills. Two students, (cases 10 and 21) performed at the first level of ability while seven students made a small number of successful attempts beyond the sixth level. Total results as recorded in Table 6 included individual grade and age scores for all levels.

Group results of the test of word recognition

The results of *Schonell's Graded Reading Vocabulary Test* were examined for group results in the pronunciation of the words. Of the one hundred words in the test only five were pronounced correctly by every student in the group. Four of these words were at the first

TABLE 6

INDIVIDUAL SCORES AT SEVEN GRADED LEVELS OF SCHONELL'S GRADED READING VOCABULARY TEST

Case No.	First Level	Second Level	Third Level	Fourth Level	Fifth Level	Sixth Level	Seventh Level	Grade Score
1	10	9	10	8	4	2	4	4.7
2	10	9	8	5	4	1	3	4.0
3	10	10	6	2	5	3	0	3.6
4	10	10	9	4	4	3	0	4.0
5	10	9	6	3	3	0	0	3.1
6	8	7	3	2	1	0	0	2.1
7	9	9	7	3	3	0	0	3.1
8	10	10	5	3	2	0	0	3.0
9	10	10	9	3	2	1	0	3.5
10	9	4	2	1	0	0	0	1.6
11	10	10	9	5	4	3	0	4.1
12	9	10	9	4	8	2	5	4.7
13	7	10	5	0	0	0	0	2.2
14	8	10	9	7	7	4	4	4.9
15	9	9	7	3	0	0	0	2.8
16	10	10	10	4	1	0	0	3.5
17	9	10	5	1	0	0	0	2.5
18	10	10	10	5	6	6	3	5.0
19	9	10	8	6	6	1	2	4.2
20	7	10	3	1	0	0	0	2.1
21	9	3	0	0	0	0	0	1.2
22	10	10	10	3	5	1	3	4.2
23	9	10	7	1	0	0	0	2.7

level and one was at the second level. The fact that a word was phonetically regular did not seem to be the main criteria for successful recognition. To some degree, recognition seemed to depend on familiarity

with the words. For example, the word "bun", even though it was one of the most phonetically regular and considered by the author of the test to be a first level word, was pronounced incorrectly by one-third of the group. The percentage of total errors, total refusals, beginning errors, ending errors, total nonsense words and total vowel errors for the whole group is recorded in Table 5. Only the first sixty words were included in the results because attempts beyond this level were too few to warrant recording. Since the test was graded, these sixty words were representative of vocabulary and word attack skills encountered in reading material of the first six levels.

At the fifth level the students refusals to attempt the pronunciation of words were equal to the number of incorrect attempts. At the sixth level more words were refused than were attempted. At the primary levels eighty-two percent of the total words were correctly recognized. At levels four, five and six this total had been reduced to twenty-seven percent.

Other observations made from Table 5 were as follows:

a) Beginning errors at first level were higher because of the inclusion of totally different words in this total.

b) Vowel errors were consistently high at all levels.

c) Ending errors were greatest at the second level. Here the beginnings were observed more closely but the group showed a tendency to guess the latter part of the word and substitute a meaningful word.

d) Nonsense words increased greatly past the second level when more attention was being given to word attack skills.

e) Total refusals became progressively greater as vocabulary increased in difficulty beyond the second level.

f) Total errors reached a peak at the third level because refusals are not included in this total.

Comparison of performances of group and individuals on the test of word recognition skills

Since this test was in the form of a word list the students were forced to use phonetic and structural analysis or configuration in their attempts to pronounce words which were not known by sight. At the first two levels most of the words were known at sight and the small number of errors was approximately equal for both levels. At the third level it became increasingly necessary to use some form of phonetic or structural analysis. At that point, as shown in Table 5, it was noted that the unrecognized words tripled in number. A further sharp increase was apparent at the fourth level.

Nonsense words did not appear in the responses until the third level, where almost one-third of the attempts at pronunciation lacked meaning. More than half of the attempts at the fifth and sixth levels were nonsense words. For most of the students in this group phonetic analysis was a mechanical exercise for reproducing a series of sounds which did not necessarily have to make sense. Attempts at pronunciation resulted in such examples as:

cam - pay - jun	-- campaign
nep - hoo	-- nephew
say - u - ker	-- saucer

Further reference to Table 5 showed that, at all levels, the most commonly recognized part of a word was the beginning letter or letters. When these correct beginnings were analysed in greater detail it was discovered that considerable success had been achieved with the pronunciation of the prefixes of the fifteen words which included this type of word part. Eighty percent of these attempts were correct.

Although the students had ample time to examine each word completely the incidence of errors in endings was considerably greater than that of beginnings. When a more detailed analysis was made of these errors in word endings it was noticed that suffixes were correct in less than half of the attempts. This total included such simple additions as the letter 's'.

Incorrect vowel sounds accounted for approximately one-third of the total number of errors. At all levels the proportion of errors due to substitution of a vowel sound remained almost constant.

Summary of findings

When the individual scores on the test of word recognition skills were examined a wide range of ability levels could be seen. It was apparent from the analysis of errors that most of the group members observed and used the sound of beginning parts of words. It was equally apparent that in more than half of the attempts at pronunciation of words from the test list, word meanings were sacrificed to the mechanics of word attack.

NEALE ANALYSIS OF READING ABILITY - ORAL

Description of test

For children who are severely retarded in reading it is often difficult to make an assessment of oral and silent reading ability by the use of standardized tests. It was felt that the Neale Analysis of Reading Ability could be adapted as an informal inventory as well as used in its prescribed form.

This test had a British standardization having been correlated at the nine, ten and eleven year levels with the Schonell's Graded Reading Vocabulary Test. The test material consisted of six passages of prose carefully graded to form a continuous reading scale. Norms were given which equated raw scores to reading ages in each of the areas of rate, accuracy and comprehension. This test was especially useful for use with extremely retarded readers because it was not only possible to equate a raw score of one point to a reading age but a score of even less than this could be extrapolated.

Procedure in testing

For testing oral reading the Neale Analysis of Reading Ability Form A was administered according to the publisher's directions. Each paragraph, up to a "ceiling" of sixteen or more errors, was read orally by each pupil and the time required for reading each paragraph was recorded. Errors in accuracy were classified as follows:

mispronunciations -- These were words which were wrongly pronounced or accented.

substitutions -- These were real words which were used instead of the words in the narrative.

refusals -- These were words which were supplied by the examiner if the child hesitated for more than four seconds.

additions -- Words inserted in the text were counted as errors.

omissions -- Words omitted from the text were counted as errors.

reversals -- These were actually mispronunciations or substitutions but were listed separately for their diagnostic value.

These classifications were made according to test directions and were examined for numbers and types of errors.

A more detailed analysis was desired to determine the actual behaviour of the group and the individual students when they were confronted with the task of visual perception of words in the oral reading of story-type material. To do this the errors made by each student were further analysed for substitutions of words which had the same beginning letter as those in the text, substitutions of words which had the same ending letter as those in the text, substitutions of words which were in no way similar to those in the text and incorrect sounding of vowels. The particular words and letters which seemed to cause each of these types of difficulty were analysed in some detail.

Publisher's directions were followed in computing individual comprehension scores for each reader level and total scores were com-

pared with the test norms to determine individual reading ages in comprehension for each pupil. In addition to this, the comprehension questions were sub-divided into two types -- those which could be answered from information given in the narratives and those in which the answer must be inferred. The total number of correct responses for each of these types of questions was computed. Trends of performance for each type were denoted by percentages of correct responses based on the number of attempts at each level. In an effort to secure a larger sampling, results were computed up to and including one level beyond the "ceiling" as indicated in the publisher's directions. As previously mentioned, this "ceiling" was defined as a total of sixteen or more errors in accuracy in any one passage.

Rate of oral reading was computed according to prescribed directions in words per minute and recorded as a reading age.

Individual results of the test in oral reading

Table 7 presents the individual scores on the three sub-tests of rate, accuracy and comprehension. When results were compared it was found that accuracy scores showed the least deviation, being clustered within a range of twenty-one months. Only seven students were able to read the first passage without errors. No other passage was read with complete accuracy by all students. The discrepancy in rate as compared with accuracy for most students was indicated in the table. In three cases (numbers 4, 18, and 19) where the reading age for rate was equal to or less than the reading age for accuracy these particular students were observed to make many repetitions in an effort to extract meaning

TABLE 7

READING AGES IN ORAL READING AS MEASURED BY THE NEALE ANALYSIS OF READING ABILITY

Case Number	Rate	Accuracy	Comprehension
1	8.11	8.2	10.8
2	8.10	8.2	8.10
3	9.3	8.0	7.10
4	8.10	8.9	9.3
5	8.9	8.0	8.10
6	8.1	7.10	7.4
7	9.2	8.3	8.11
8	8.9	7.10	7.10
9	10.0	8.2	9.5
10	8.8	7.0	6.6
11	8.9	7.10	7.6
12	9.2	8.6	9.1
13	7.6	7.6	7.6
14	9.5	8.5	8.7
15	10.3	7.10	6.11
16	14.0	8.2	7.6
17	9.6	7.11	7.6
18	8.4	8.3	9.1
19	8.5	8.5	8.10
20	10.7	7.3	7.3
21	8.9	7.0	6.6
22	12.0	8.9	8.10
23	9.4	7.5	7.1

from the selections read. For these students comprehension was their highest score.

Group results in oral reading of the Neale Analysis of Reading Ability

The widest range of scores in the oral reading test was in rate, with comprehension and accuracy following in order. The range for the separate sub-tests are shown in Table 8 as follows:

TABLE 8

RANGE OF ABILITY AND MEAN SCORES OF THE SUB-TESTS OF THE NEALE ANALYSIS OF READING ABILITY

Test Item	Range of Ability in Reading Ages	Difference	Mean Reading Age
Rate	7.6 -- 14.0	6 years 6 months	9.6
Comprehension	6.6 -- 10.8	4 years 2 months	8.1
Accuracy	7.0 -- 8.9	1 year 9 months	7.11

For the group as a whole the greater mean score in rate was seemingly due to the fact that many of the members appeared to be satisfied to substitute other words for those in the text without taking time to make meaning out of the selections which were read. The mean score in comprehension was only two months higher than the mean score in accuracy even though the number of years of experience and the normal or above normal intelligence ratings of the group as a whole would point to the possibility of a higher mean comprehension rating than was actually achieved.

Only the first three passages of the reading scale were considered in the total results for the group since only two members of the group scored on the fourth level. The scores at the fourth level were taken into account only in the individual results.

Comparison of performances in oral reading for the group and individuals

As mentioned previously only two members of the group were able to score in the reading of the fourth passage. All others had made more than the maximum limit of sixteen errors in accuracy. For this reason only the results of the first three passages were compared.

Performances in the sub-test for rate were equal to, or higher in every case than the corresponding scores for accuracy. The group as a whole as well as each individual student were reading too quickly for their ability in word recognition.

Table 9 shows the proportion of types of errors in accuracy made by the group. The results of the accuracy sub-test showed that substitutions accounted for the majority of errors. Refusals and mispronunciations followed in order of frequency. Additions, omissions and reversals, while important for individual diagnoses, were relatively few in number for the total group. Table 9 shows the proportion of types of errors in accuracy made by the group.

Most of the incorrect attempts, whether they resulted in real words or nonsense words, made use of the same beginning part as the word in the text. A much smaller proportion of the attempts showed the ability to use the correct ending sound.

Inability to use the correct vowel sound was responsible for a considerable number of errors. Reference to Table 10 would seem to indicate that this type of error was less prevalent in the reading of the first passage. However, as was previously mentioned, half of the

TABLE 9

COMPARISONS OF TYPES OF ERRORS IN ACCURACY WITH THE TOTAL NUMBER OF ERRORS IN EACH PASSAGE

Passage Number	Total Errors	Mispronunciation	Substitutions	Refusals	Additions	Omissions	Reversals
1	37	2%	89%	8%	0	0	0
2	117	1%	63%	20%	4%	5%	4%
3	352	13%	69%	13%	2%	0.5%	0.5%
Total	506	10%	69%	14%	2%	1%	1%

TABLE 10

TYPES OF WORD RECOGNITION PERFORMANCE COMPARED TO NUMBER OF INCORRECT ATTEMPTS

Passage Number	Total Substitutions and mispronunciations	Percentage of similar beginnings	Percentage of similar endings	Percentage of Vowel errors	Percentage of different words
1	34	29%	20%	8%	50%
2	76	73%	34%	34%	36%
3	292	64%	26%	29%	7%
Total	402	63%	27%	28%	16%

substitutions in this passage did not resemble the words of the text. Since it was apparent that the format of these words had been completely disregarded these were not included in the total number of vowel errors. This would account to a considerable degree for the comparatively small proportion of vowel errors in the first passage.

Because many of the substituted words made sense in the text but bore no resemblance to the configuration or letter details of the original words these were listed separately in Table 10 as "different words".

The largest proportion of this type of substituted word occurred in the first two passages. Such substitutions as the following were noted:

by my door -- by the door
to my mother -- to my house

In contrast, substitutions at the higher levels, though real words which partly resembled the original often did not make sense. Some examples were:

the lion finally art -- the lion's final act
she shipped fell -- her whip fell

It seemed that when attention was given to meaning, word forms were of secondary importance. On the other hand, when it became necessary to perceive the words more closely the need for making meaning was neglected.

In many of the errors prefixes and, to a lesser extent, suffixes had been recognized correctly. When this type of performance was analysed in greater detail it was found that the proportion of correct prefixes was almost twice that of suffixes.

When suffix errors were examined in greater detail it was discovered that certain specific suffixes were more prone to error than others. In twenty-three cases of incorrect attempts to pronounce words in which 's' or 'es' had been added to the root word the error was caused in all cases by the omission of the suffix. Four encounters with 'er' as a suffix resulted in four omissions of this word part. In ten incorrect attempts to pronounce words containing 'ly' as a suffix

this was omitted in seven of the attempts. The suffix 'ed' was encountered most frequently. It was omitted in half of the attempts. The suffix 'ing' seemed to result in the least difficulty, with eleven of sixteen attempts being correct. A number of other incorrect attempts were noted in which the suffixes 's', 'ed' and 'ly' were added to root words which did not require them.

An analysis of correct responses to comprehension questions shows a steady decrease in percentage of accuracy in total comprehension. However when the questions at each level were sub-divided into those which required memory of story facts and those which required the use of inference the percentage of accuracy for answers to the inference type were higher than those for the factual type at all levels past level two.

Summary of oral reading

For the group as a whole comprehension depended largely on accuracy of word recognition. In the easier passages attention to details of words was subordinate to meaning, whereas in the more difficult passages where a phonetic or structural type of word attack skill was required much of the text became meaningless. The most consistently correct part of attempted words was the beginning letter or letters. There was a tendency to ignore accuracy in the perception of sight words in the easier passages of text. Errors in word parts, especially suffixes, tended to be specific rather than general. For most members of the group the rate of reading exceeded the ability in both accuracy and comprehension.

NEALE ANALYSIS OF READING ABILITY - SILENT

Procedure in testing

The three forms of the Neale Analysis of Reading Ability were standardized only for oral reading. However, since it was desired to compare the performance of each member of the group in silent and oral reading, Form B of this test was administered as an informal inventory of silent reading. The rate of reading was computed for each level in an attempt to discover the effect of vocalization on speed of performance as the content became progressively more difficult. The comprehension questions were read orally by the examiner and answered orally by the students.

These two parallel forms of the Neale Analysis of Reading Ability were used in this way so that an informal comparison of comprehension and rate of oral and silent reading could be made using a similar type of material without losing the benefit of the publisher's norms for oral reading for comparisons of reading ages with those given for other tests. For purposes of this survey, administration of the two forms was kept as nearly parallel as possible so that comparisons would be more valid. Each child was encouraged to proceed at least two levels beyond his "ceiling" in oral reading so that any advantages which might possibly result from a greater opportunity to concentrate on meaning rather than word recognition could be noted.

Comprehension questions were again divided into fact and inference types. The percentage of correct total responses, percentage of correct responses to factual material and percentage of correct

responses to inferred material was noted. Rate as measured in words per minute was also recorded. Since no norms were available, only raw scores as compared to number of responses could be used to show trends of performance.

Individual results of the test in silent reading

Because all the children did not read the same amount of material the total raw score in silent reading comprehension was converted into a percentage which indicated the number of correct answers as compared to the number of questions attempted for each individual student. When these percentages were compared with rate in Table 11 it was apparent that, with the exception of two students who read very slowly (numbers 2 and 19), neither the fastest readers nor the slowest readers had the best percentage of comprehension. The two students who read the greatest number of words per minute (numbers 1 and 22), appeared to vocalize very little when reading silently. The three students who read most slowly vocalized all the passages which they attempted. With two of these students comprehension may have been reinforced by the vocalization since their rates of comprehension were comparatively high.

Group results in silent reading

The total results in speed of reading (Table 11) were characterized by a wide spread of scores ranging from forty-five words per minute to one hundred thirty-seven words per minute. The mean number of words per minute was seventy-seven.

TABLE 11

COMPARISON OF COMPREHENSION SCORES IN SILENT READING WITH RATE IN WORDS PER MINUTE

Case Number	Number of Passages Read	Rate in Words Per Minute	Percentage of Possible Correct Answers
1	5	137	55.5%
22	5	113	63.8%
9	4	105	53.5%
18	3	102	70%
3	4	97	39.2%
23	3	95	60%
20	3	85	65%
15	3	85	60%
17	3	85	50%
5	4	82	67.8%
16	5	78	38.8%
7	4	76	75%
11	3	75	70%
4	5	74	66.6%
12	5	72	47.2%
14	5	67	47.2%
21	3	66	55%
8	3	57	65%
13	3	53	50%
6	3	49	65%
10	3	46	35%
2	4	46	71.4%
19	4	45	75%

The children were observed closely during the silent reading. All but the two students with the highest scores showed evidence of vocalization. For the majority of the group there was little difference

in fluency regardless of whether the reading was oral or silent.

When the comprehension questions at the end of each passage were divided into fact questions and inference questions and when the correct answers were totalled for each type, the percentage of fact questions answered correctly by the group was greater than the percentage of inference questions. Reference to Table 12 will show considerable difference for all passages with the exception of passage two. All pupils attempted the first three passages but no pupil was able to proceed beyond level five.

TABLE 12

COMPARISON OF PERCENTAGE OF CORRECT RESPONSES TO TYPES OF COMPREHENSION QUESTIONS

Passage	Fact Questions	Inference Questions	Total
1	92%	77%	89%
2	70%	75%	72%
3	45%	42%	43.5%
4	67%	45%	50.6%
5	38%	22%	28%

Comparison of performances in silent reading of the group and individual students

Wide fluctuations in rate characterized the performances in silent reading. These ranged from forty-five to one hundred and thirty-seven words per minute as previously noted in Table 11. These differences seemed to depend on the amount of vocalization used by each student. With some of the students vocalization was not evident until

the third passage. Others vocalized all passages. Several of these slower readers used a finger as a place holder.

Of the two types of comprehension questions the group as a whole performed better when answering fact questions than when making inferences. For many students meaning was not acquired during the reading or was forgotten immediately following because the response to many questions of both types was, "It didn't say."

Summary of silent reading

Many students in the group were unable to read silently at any level. All of their efforts were audible to the examiner. For these students silent reading was, in reality, a vocal performance. Questions soliciting facts were answered more readily than were those requiring inferences when questions followed the reading of the passage. Rate of silent reading seemed to make little difference to accuracy of comprehension for most of the students in the group.

NEALE SUPPLEMENTARY DIAGNOSTIC TEST I

Names and sounds of letters

Schonell (1950), Durrell (1940), and Gates (1937) all included tests of ability to name the letters of the alphabet and give the usually accepted basic sound for each. McKee (1948, p. 147) suggested that a child "should learn to distinguish the form of each letter from the form of any other letter before he begins to read." Schonell suggested that deficiencies in knowledge of letters or common sounds should be checked before embarking on a remedial program.

Description of the test

To test familiarity with the names and sounds of letters Neale Supplementary Diagnostic Test I of the Neale Analysis of Reading Ability was used. In this test the letters of the alphabet were arranged in rows according to visual similarity so that specific recognition could be tested quickly.

Procedure in testing

The subject was asked to name and sound each letter and a record was made of each child's response.

Supplementary Diagnostic Test I was analysed for the group and for each child to discover which letter names and letter sounds presented the most difficulty for the total group. Each child's responses were further examined to discover patterns of performance on naming and sounding vowels and consonants. These patterns were recorded for comparison with application to words in other test situations.

Individual results in the test of naming and sounding letters

A survey of each student's performance in naming and sounding the separate letters is shown in Table 13. Half of the group made one or more errors in letter names. Every student made two or more errors in pronouncing the individual letter sounds. Several students confused the letter names and sounds. Some could attach only the name or long sound to the vowels.

TABLE 13

SURVEY OF PERFORMANCES IN NAMING AND SOUNDING THE LETTERS

Case Number	Number of Errors in Letter Names	Incorrect Letter Names	Number of Errors in Letter Sounds	Incorrect Letter Sounds
1	0		4	u, i, y, x
2	0		3	o, i, y
3	0		3	o, x, i
4	0		2	x, y
5	1	l	4	o, e, z, x
6	1	z	3	o, e, x
7	1	i	9	f, i, m, r, n, s, z, j,z
8	2	d, l	6	a, o, s, x, w, y
9	0		2	i, y
10	0		4	o, e, x, q
11	1	v	2	x, v
12	0		2	m, x
13	0		7	e, f, u, i, m, x, y
14	1	v	3	e, z, x
15	0		6	o, u, i, x, y, q
16	0		8	o, f, h, u, i, y, x, q
17	3	d, z, x	5	a, c, o, e, x
18	0		2	y, w
19	0		7	c, o, d, i, x, w, y
20	1	w	8	o, e, u, i, r, x, q, y
21	2	h, j	6	c, o, e, u, i, y
22	4	l, t, v, x	2	e, x
23	2	l, r	3	o, r, s

Group results in the test of naming and sounding the separate letters

In the test for naming of letters, eleven students made one or

more errors in naming the letters. A total of nineteen errors were made in letter names by the whole group.

When letter sounds were required the directions were given thus: "Give each letter a sound other than its name." This necessitated the pronunciation of the short vowel sounds. No student in the group was able to give a correct sound for all the letters of the alphabet. The pattern of response common to the whole group was the addition of the short sound of 'u' to each consonant. In a smaller number of cases this sound preceded the consonant as in 'ul' or 'ur'. These types of errors were not counted in the totals given in Table 13 since every attempted consonant sound was pronounced in this way by all students.

Comparison of group and individual performances

As was expected, the naming of letters which were similar in form caused the most confusion. The following errors were recorded more than once:

v -- u
l -- i
r -- n
d -- b

It should be noticed that, although 'd' was named incorrectly, 'b' was not. Nor was there evidence of confusion between several other pairs of letters which are similar in form such as 'e' and 'c' and 'p' and 'q'.

Almost half of the total errors were the result of confusion

among the short vowel sounds or the inability to supply the short sounds of the vowels 'a', 'e', 'i', 'o' and 'u'. Either a vowel or a consonant sound was accepted for the letter 'y' but the resultant errors or omissions in sounding this letter accounted for a large proportion of the total. The letter 'x', perhaps because it is less commonly used, was also the cause of much difficulty. In all, 70.1 percent of the total errors was caused by the above mentioned seven letters.

Table 14 shows the frequency of errors for the various letter sounds. Also included in this table is the number of times each letter was confused with other letters or sounds.

Summary of naming and sounding letters

Difficulties encountered in associating letter symbols with their correct sounds appeared to be specific for a small group of letters rather than general for all the letters. In naming the letters, all the errors with one exception were caused by the incorrect naming of consonants. In sounding the letters the short vowel sounds were the most troublesome. The majority of vowel errors were caused by the inability to associate the correct vowel sounds with their symbols while the majority of consonant errors resulted from inability to isolate the sound.

MONROE-SHERMAN DIAGNOSTIC READING APTITUDE AND ACHIEVEMENT TESTS

Although these tests in their entirety were designed to test certain areas of achievement as well as aptitude, for the purpose of

TABLE 14

FREQUENCY OF ERRORS IN LETTER SOUNDS AND THE SPECIFIC SOUNDS WHICH WERE CONFUSED

Frequency	Letter	Number of times mistaken for	Omissions
18	x	ĕ (3) k(3) ĕx(3) ĭ(2) miscellaneous (4)	3
13	o	ō(7) oo(3) ŭ(3)	
12	y	wu(3) ŭ(3) miscellaneous (4)	2
11	i	ĕ(4) ŏ(2) miscellaneous (5)	
9	e	ĭ(4) ŭ(3) ă(2)	
6	u	yŭ(4) oo ă	
4	q	kŭ (4)	
3	z	s(2) ēe	
3	r	ar or ker	
3	w	whŭ (2) ŭ	
3	m	ĭm mă ĕm	
3	f	ŭf ĕf ĭf	
3	c	kĭ(2) kă	
3	s	ĭs zŭ(2)	
2	a	ĕ ā	
1	v		
1	n	ĕn	
1	j	joo	
1	d	dē	
1	h	hă	
0	g		
0	b		
0	p		
0	l		

this study only part two, the section which dealt with reading aptitudes, was administered. The aptitudes which seemed to be most closely associated with the ability to learn to read were tested as follows:

Visual

1. Letter memory
2. Form memory

Auditory

1. Letter memory
2. Orientation and Discrimination

Motor

1. Copying text
2. Cross-out letters

Language

1. Vocabulary

Description of the test

The visual aptitude tests were so designed that it was possible to ascertain whether weakness in visual memory was the result of lack of development of the aptitude or inadequate training in the application of the skill to letters and words. Auditory letter memory tested the ability to retain and reproduce a sequence of letters which were dictated by the examiner. Also included in the tests of auditory aptitude was the ability to discriminate between words having only slight differences in sounds. Motor aptitudes included the ability to copy text in writing as well as the more mechanical skill of selecting details from printed material. Knowledge of word meanings was tested by material which was read orally by the examiner. The child was asked to choose sensible groups of words from those which did not make sense.

Procedure in testing

The standardization which was given in percentiles compared to chronological age was recorded. The performance of the group in each separate aptitude was recorded in graphic form so that comparisons of strengths and weaknesses of each sub-test could be made. A profile of each child's test responses was prepared so that individual comparisons could be made with performances on other tests. The test results were analysed for the following reasons:

a) To look for patterns of visual, auditory and motor responses

b) To look for patterns of visual, auditory and motor responses which have been transferred to letters and words

An analysis was made of each child's responses in the sub-tests of visual letter memory, visual form memory and auditory letter memory to note reversals. A further check was made of the sub-tests of visual letter memory and auditory letter memory to compare the incidence of beginning and ending letters which were similar to those of the test. These were used for comparisons with performance on words in other test situations.

Individual results of the Group Diagnostic Reading Aptitude Tests

The diagnostic profile chart which is included in the test booklet uses percentile ranges to indicate superior, average or inferior aptitudes for learning to read. On the basis of totals of

individual percentiles, the percentage of aptitude scores which were classified according to each of these categories is shown in Table 15. Reference to this table will show that, although all of the students in this study had severe learning difficulties, their learning aptitudes were distributed through all three percentile ranges.

TABLE 15

DISTRIBUTION OF APTITUDE SCORES ACCORDING TO RATINGS OF INFERIOR, AVERAGE OR SUPERIOR

Range of Percentiles	Rating	Percentage of Total Responses
0 - 24	inferior	53.4
25 - 74	average	38.5
75 - 90 +	superior	8.07

A characteristic feature of the individual profiles was the number of percentile ratings which fell into the inferior category. Each member had from one to seven inferior scores. The few superior scores were offset in every case by correspondingly larger numbers of inferior scores. One student was inferior in all tests. Table 16 shows the total number of scores which fall into each of the categories designated as superior, average and inferior.

TABLE 16

DISTRIBUTION OF TOTAL PERCENTILE SCORES FOR EACH STUDENT IN SUPERIOR, AVERAGE AND INFERIOR CATEGORIES

Case No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Categories	Percentile Scores																							T.
Superior			1	3			2	1			1		1					2		1	1			13
Average	4	3	4	1	2	3	2	1	2		3	4	1	6	4	4	5	1	3	2	1	4	2	62
Inferior	3	4	2	3	5	4	3	5	5	7	3	3	5	1	3	3	2	4	4	4	5	3	5	86

A summary of the percentile ratings for each student is shown in Table 17.

TABLE 17

SUMMARY OF THE PERCENTILE RATINGS OF EACH STUDENT ON THE SUB-TESTS OF THE MONROE-SHERMAN READING APTITUDE TEST

Case	Visual Mem.	Visual Form	Aud. Mem.	Aud. Dis.	Motor Copy	Motor Crossout	Lang. Oral
1	15	70	-10	35	-10	45	70
2	10	10	10	60	-10	35	70
3	60	10	80	60	15	25	70
4	15	80	80	20	10	75	70
5	-10	50	30	-10	-10	-10	20
6	10	40	-10	10	15	25	30
7	-10	90+	45	-10	10	85	40
8	10	90+	10	-10	15	65	20
9	10	50	-10	15	-10	45	20
10	-10	20	20	-10	-10	15	20
11	10	45	45	20	15	50	80
12	15	30	30	10	-10	25	70
13	-10	20	20	60	-10	90+	10
14	60	50	30	-10	30	55	45
15	-10	30	-10	10	29	55	30
16	12	45	30	70	-10	23	60
17	35	30	45	60	20	38	-10
18	-10	20	20	75	-10	33	80
19	15	40	30	45	-10	13	20
20	13	45	10	30	-10	88	20
21	10	20	20	70	-10	10	80
22	-10	30	30	45	13	60	14
23	-10	-10	-10	-10	-10	25	30

+ above the ninetieth percentile

- below the tenth percentile

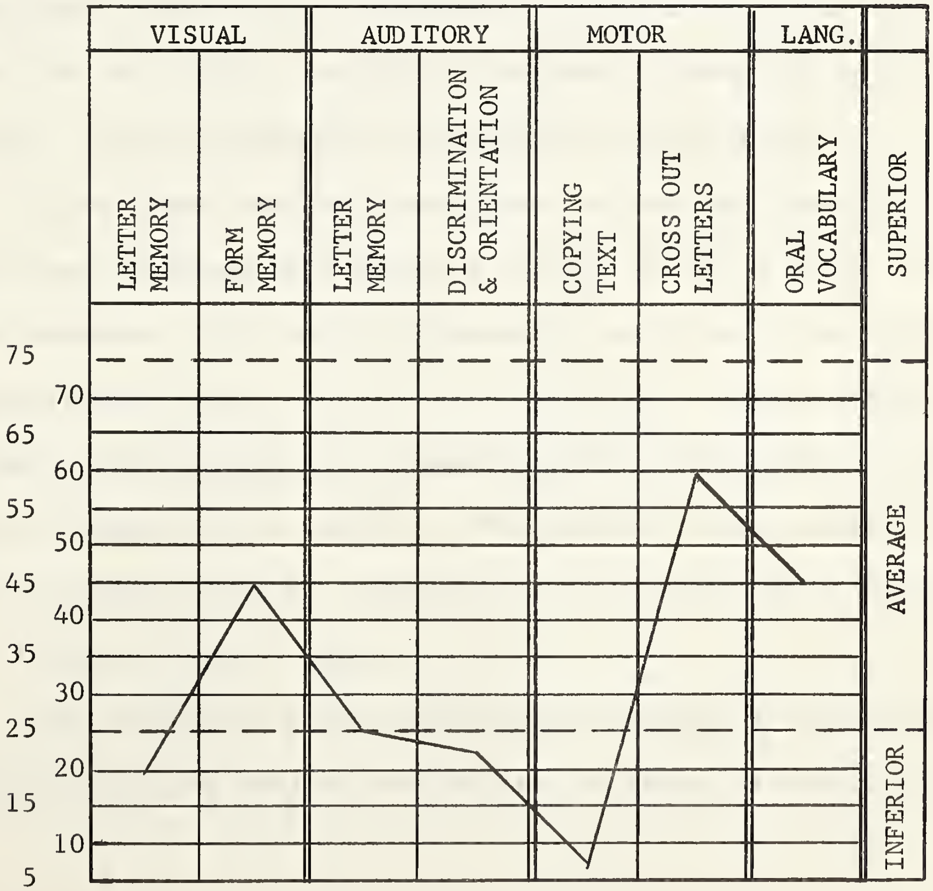
Of the twenty-three members of the group, only four students (numbers 6, 10, 12 and 23) scored below the fiftieth percentile in all of the sub-tests. Each student in the group was inferior in one or more of the items.

Group results in aptitudes for reading

Although this test was designed for administration as a group test no group norms were supplied. Only individual results are given percentile ratings for diagnostic purposes. Group results were recorded only for purposes of this study to indicate trends of performance for the group as a whole.

FIGURE 1

GROUP DIAGNOSTIC APTITUDE TESTS



PROFILE OF TOTAL RESULTS OF APTITUDE TESTS FOR THE GROUP

Group results were obtained by totalling the raw scores for each sub-test. The mean chronological age of twelve years four months was used to compute group percentiles. A profile of the results of the aptitude tests for the group is shown in Figure 1.

In the second motor test which involved crossing out letters, it was necessary to remember only a single form -- the letter 'a' -- so that it could be differentiated from other letters. When only one form needed to be remembered and the motor skill involved in crossing out the letter was only a single act, that of drawing a line through a letter, the majority of the group performed in the high average category as was shown in Table 17.

Four students who had the highest performances in the test of Crossing Out Letters were among the lowest performers in the test of Copying Text. The profiles for these two aptitude tests as shown in Figure 2 record a wide diversity of performance among the individual students. Only four students were inferior in both tests.

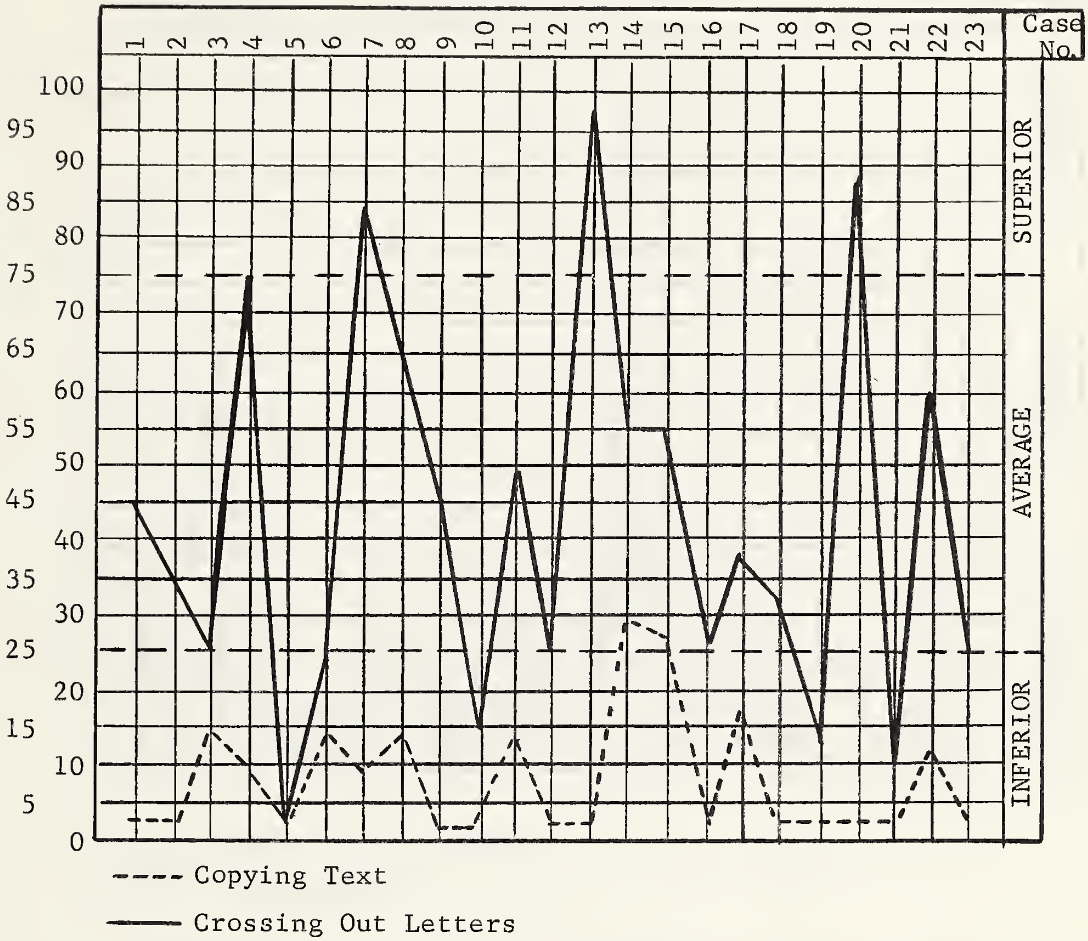
In the motor aptitude test which required the copying of a story, it was necessary to remember a variety of letter forms in their correct sequence. The task of reproducing the letter forms involved a more complicated skill than that of crossing out a single letter. On this test which included letter memory combined with hand-eye coordination the group result was poor. The profile of the results of this test as recorded in Figure 2 showed that all students were close to or in the inferior range of ability.

When the group results for the test of copying text were compared with the group results for the test of visual letter memory it

FIGURE 2

DIAGNOSTIC READING APTITUDE TESTS

PROFILES OF MOTOR TESTS OF COPYING TEXT AND CROSSING OUT LETTERS



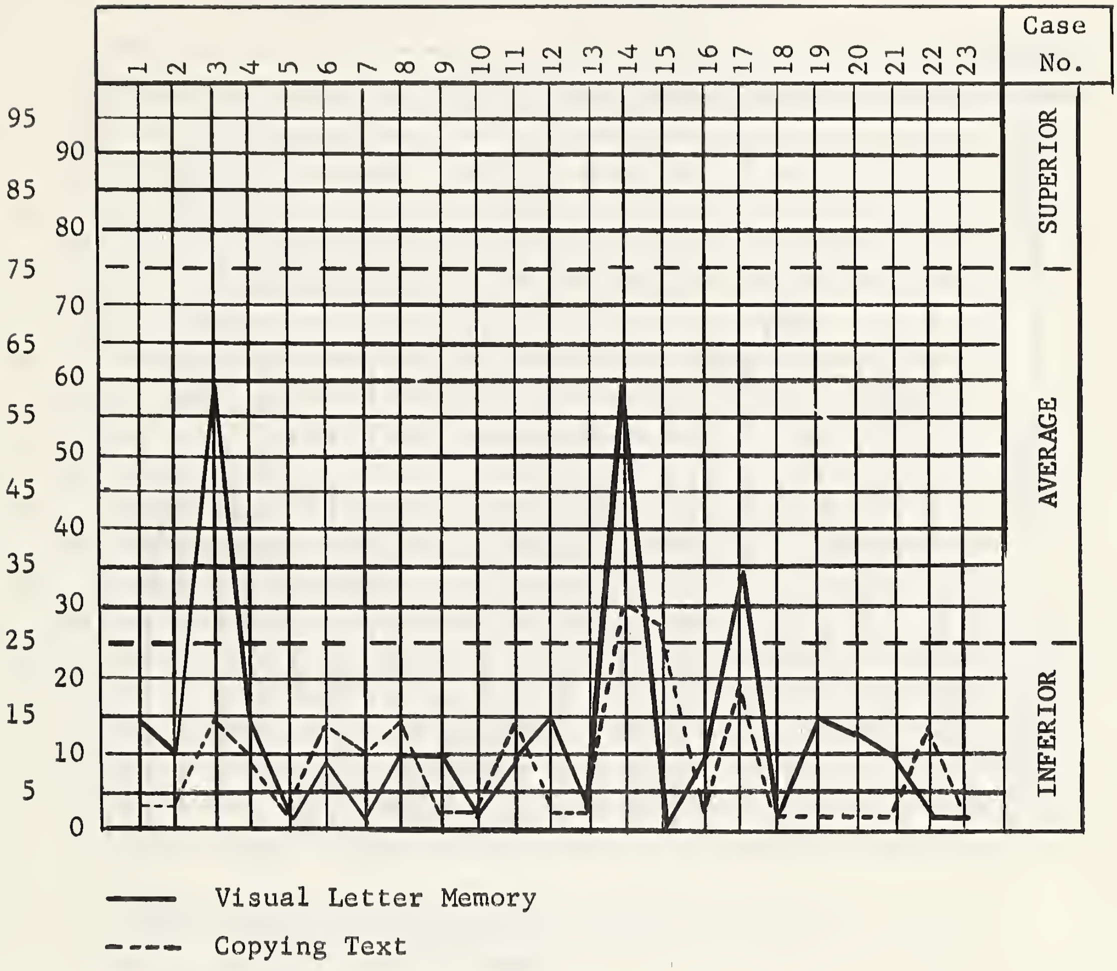
could be seen that both tests followed a similar pattern of performance in the inferior category. Figure 3 compares the profiles of these two tests.

Three students reached percentiles in the normal category in Visual Letter Memory. These same three students were among the higher performers in Copying Text although none of the scores in this letter test were above the thirtieth percentile.

FIGURE 3

DIAGNOSTIC READING APTITUDE TESTS

PROFILES OF VISUAL LETTER MEMORY AND COPYING TEXT



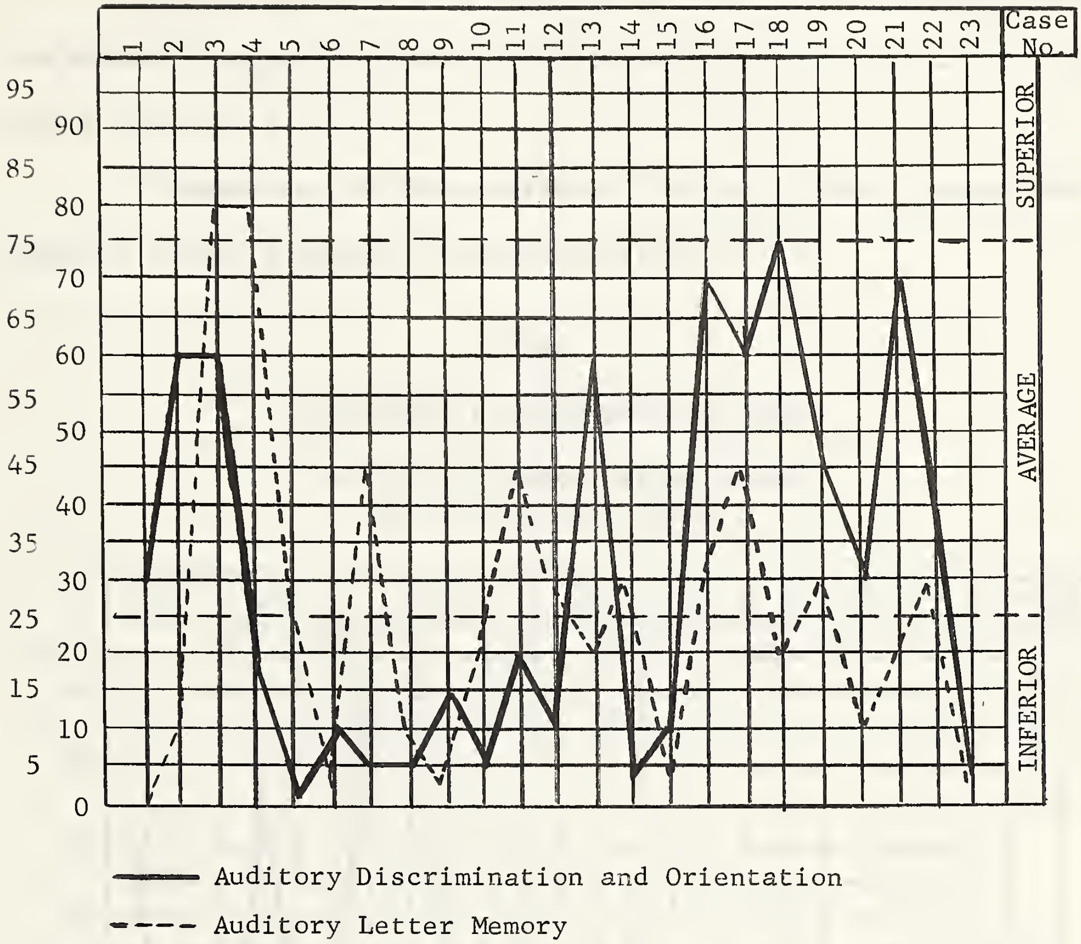
When the group results were examined for auditory aptitude, auditory letter memory and discrimination of sounds within words, the total results showed a closer relationship than any of the other pairs of tests. However this relationship was not consistent for individual scores in these areas.

A comparison of the profiles of the two tests which measure auditory aptitude is shown in Figure 4.

FIGURE 4

DIAGNOSTIC READING APTITUDE TESTS

PROFILES OF AUDITORY LETTER MEMORY AND ORIENTATION AND DISCRIMINATION



The greatest range in performance on Auditory Letter Memory was actually caused by the scores of two students who reached the superior category. All other scores in this test fell below the fiftieth percentile. Neither of these two students had correspondingly high scores in the test of Auditory Discrimination and Orientation.

A comparison of the tests which measure the two areas of visual aptitude -- Visual Letter Memory and Visual Form Memory -- revealed a

difference in the total results for the group which was definitely in favour of Visual Form Memory. This difference was also apparent for eighteen of the individual members of the group.

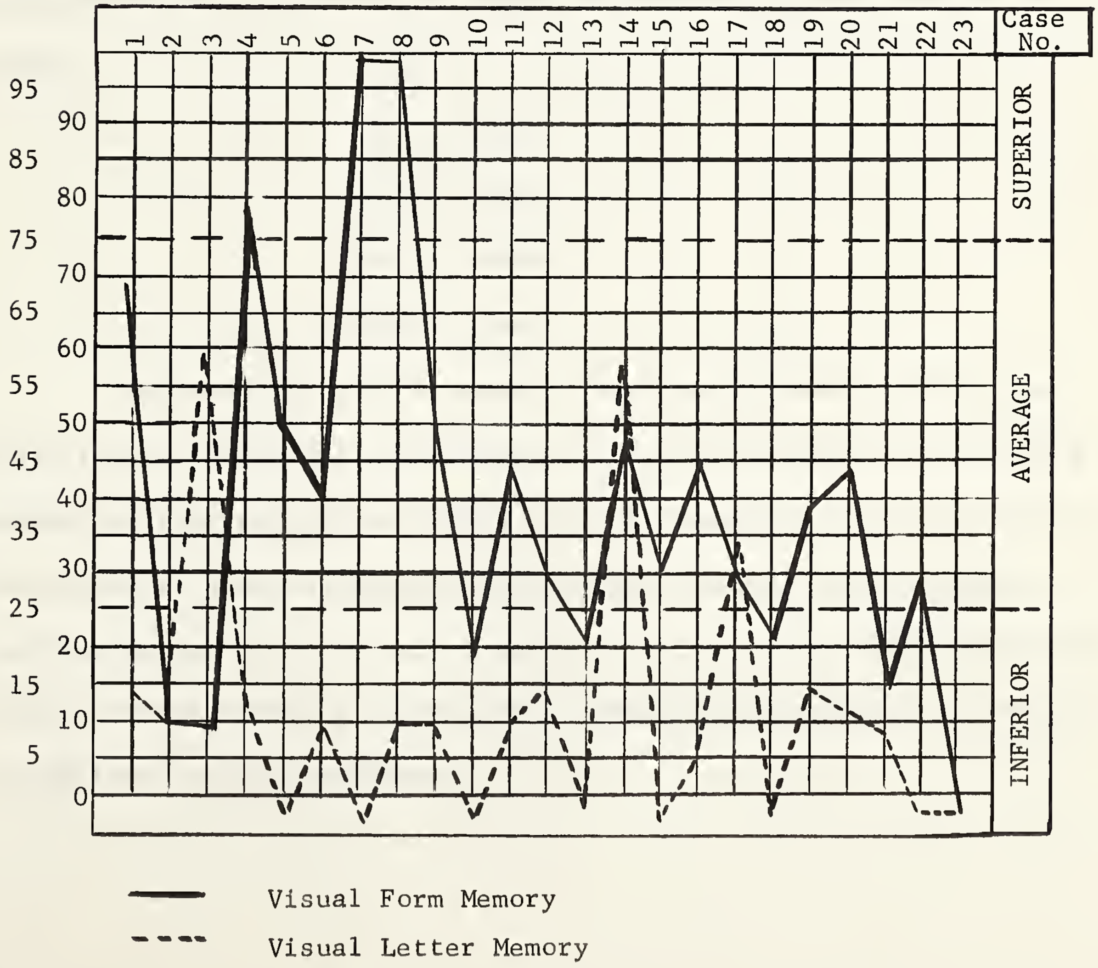
It must be noted that the test of Visual Letter Memory required the memory of correct sequence as well as form while the test of Visual Form Memory did not.

A comparison of the profiles of the tests which measure the two areas of visual aptitude is shown in Figure 5.

FIGURE 5

DIAGNOSTIC READING APTITUDE TEST

PROFILE OF VISUAL LETTER MEMORY
AND VISUAL FORM MEMORY



It was observed that two very high scores were achieved in Visual Form Memory. The corresponding scores for these same students in Visual Letter Memory were both very low. Only three students showed scores in favour of Visual Letter Memory. The profiles for these two tests showed some of the widest ranges of corresponding scores of any of the tests which were selected for comparison.

The test for measuring ability in oral language was so constructed that some degree of ability in auditory discrimination was necessary. All the pairs of words used as test items were read to the student by the examiner. The student responded by underlining the pair of words in each group which make the best sense. The following example from the test will illustrate the need for careful auditory discrimination to distinguish groups of words which were similar in sound:

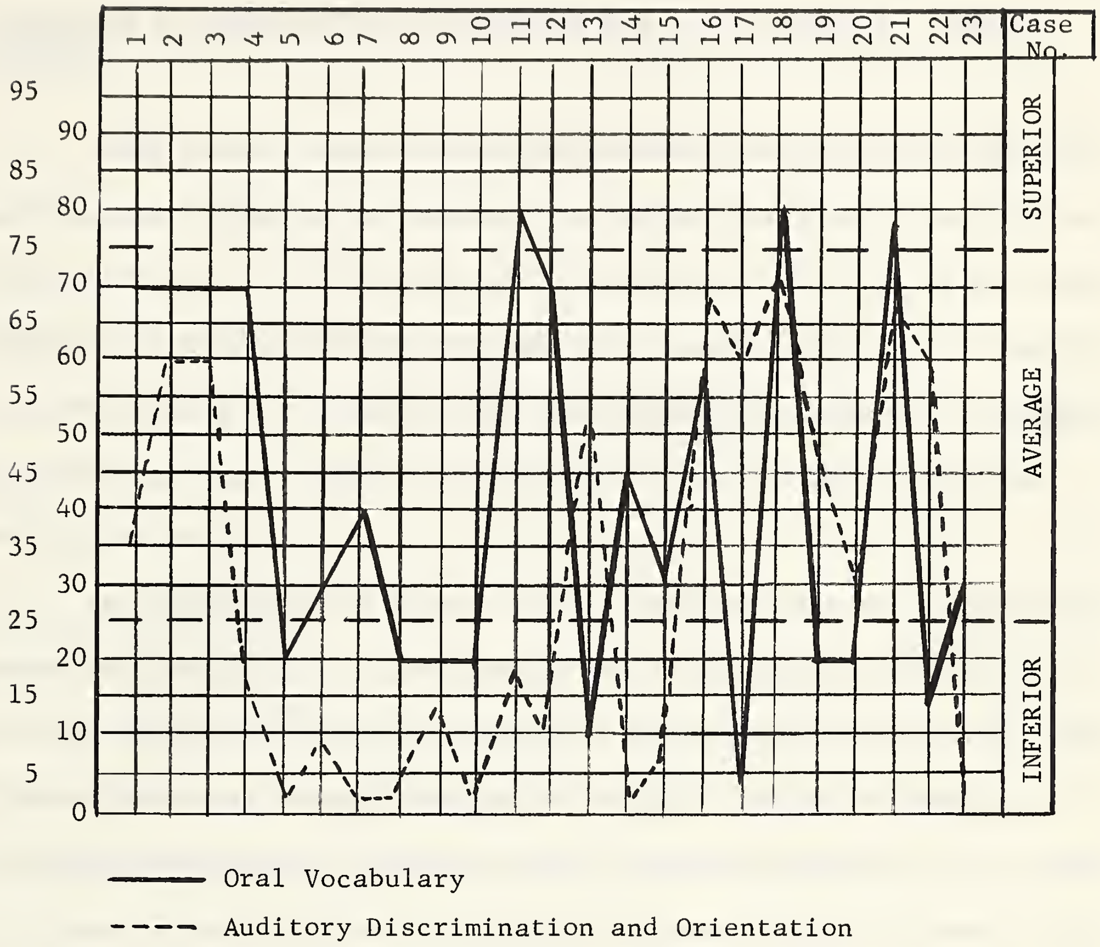
coin ropes
coin money
coin monkey
coin cobs

The test for Oral Vocabulary was compared with the test for Auditory Discrimination and Orientation. Total results for the group showed a higher percentile rating for Oral Vocabulary. This may have been aided by some assistance from context clues in the vocabulary test as opposed to words out of context in the test of Oral Discrimination. Eighteen members of the group exhibited a difference in favour of the test of Oral Vocabulary.

FIGURE 6

DIAGNOSTIC READING APTITUDE TESTS

PROFILES OF AUDITORY DISCRIMINATION AND ORIENTATION AND ORAL VOCABULARY



A comparison of the profiles of the tests for Auditory Discrimination and Oral Vocabulary is shown in Figure 6.

When the profiles for these two tests were examined it was noted that the profiles for students one through twelve followed a fairly consistent pattern, with the higher scores all being in favour of Oral Vocabulary. The remainder of the group, students thirteen through twenty-three, had an entirely different pattern of performance. For

this latter group the ranges in corresponding scores tended to be smaller, and the percentile scores showed no consistent difference in favour of either test.

Comparison of group and individual results in the tests of reading aptitude

When group results of the various aptitude tests were examined the greatest variation was observed in the two sections of the test of motor aptitude -- copying text, and crossing out letters. Of the seven separate skills measured the highest total result was obtained from the test of crossing out letters while the lowest total result was obtained from the test which required the copying of story-type material as shown in Figure 1.

An examination of Figure 1 will also show that the most notable feature of the profile of performance for the group was the fact that both the lowest and the highest areas of performance were the two items of Motor Aptitude. There appeared to be only a slight difference in the group performance in the two items of Auditory Aptitude. The group as a whole performed below the fiftieth percentile in all items of the aptitude tests with the exception of the test of Crossing Out Letters.

Summary of findings

More than half of the total aptitude scores for the group were below the twenty-fifth percentile. Many individual profiles were characterized by wide variations in scores. The two sub-tests which showed the smallest amount of variation, Copying Text and Visual Letter Memory, also had the most low scores.

GATES ASSOCIATIVE LEARNING TESTS

Description of the test

This series of tests was designed to approximate the actual forms of learning which were used in the beginning stages of learning words. Two of these tests measured the learning of pairs of visual symbols; two others required the association of auditory and visual items. In the two tests of visual association, printed symbols of various shapes were used to represent words while pictures were used for meaning. The two tests of auditory-visual association also used printed symbols to represent words but meaning was associated with spoken words.

Procedure in testing

Norms for these tests were given as grade status equated with the number of correct responses. These were then tabled according to designations of mean, low and very low scores. For the pupils involved in this study, mental grade rather than actual grade was considered to be a more valid measure of associative learning ability. Mental grade was the term used by the author of the test, (Gates, 1937, p. 528), which indicated a pupil's grade position equivalent to mental age.

Since this test was the only one given which attempted to approximate an actual teaching-learning situation, the analysis was made in terms of the learning performance of the whole group and of the individual students. The following items were recorded for each test:

a) Total correct responses in visual learning situations
b) Total correct responses in auditory visual learning situations
c) Number of trials required for each type of learning
d) Number of correct responses for each item

An attempt was made to record the actual response to each item but this was found to be impractical.

Individual results in Gates Associative Learning Tests for each member of the group

When individual results for each of the four Tests of Associative Learning was examined four students had mean scores or better for all tests, fourteen students were low or very low in one test and five were low or very low in two tests. In Table 18 the median, low and very low scores are compared with each pupil's Mental Grade.

When speed of learning was considered for individual students the number who learned the whole series before the tests were completed were shown in Table 19.

It should be noted that only one student completed test B1 before the required number of trials. This same student completed all tests in the series in a similar manner.

Group results of the Gates Tests of Associative Learning

In scoring these tests mental grade scores were computed from mental ages by the table of norms as supplied by the publisher. (Gates, 1937, p. 609) These mental grade scores were then compared with Grade

TABLE 18

COMPARISON OF INDIVIDUAL CATEGORY LEVELS IN ASSOCIATIVE LEARNING WITH MENTAL GRADES

Case Number	Mental Grade	Visual - Visual		Auditory - Visual	
		A1	A2	B1	B2
1	7-5	M	M	M	L
2	7-5	M	M	M	M
3	9-6	M	VL	M	M
4	8-5	M	M	M	M
5	9-1	M	M	M	M
6	6-1	M	L	M	M
7	7-0	M	VL	M	M
8	7-5	M	VL	M	M
9	8-4	M	VL	M	VL
10	8-6	M	VL	M	M
11	8-8	M	M	M	M
12	9-10	M	VL	M	M
13	7-3	M	VL	M	M
14	10-2	M	VL	M	M
15	7-5	L	VL	M	M
16	6-8	M	VL	M	L
17	6-8	M	VL	M	M
18	6-6	M	VL	M	M
19	9-1	M	L	M	M
20	6-6	M	L	M	M
21	6-4	M	VL	M	L
22	8-1	M	VL	M	L
23	5-6	M	VL	M	M

M - Mean Score   L - Low Score   VL - Very Low Score

Status. (Gates, 1937, p. 625) Results were grouped according to the following categories: (M) Mean Score; (L) Low Score; (VL) Very Low Score.

TABLE 19

NUMBER OF STUDENTS WHO LEARNED THE SERIES BEFORE TESTS WERE COMPLETED

Test	Number of Students Who Learned the Series Before Tests Were Completed
Visual-Visual, A1	7
Visual-Visual, B1	1
Auditory-Visual, A2	17
Auditory-Visual, B2	10

When a student's mental grade was above 7.0, the highest grade given in the table of norms, results were computed at the 7.0 grade status. In these cases it was felt that any results lower than those recorded for the 7.0 grade level would indicate special weakness in associative learning.

As shown in Table 20 the results for the group indicated that in both tests where the word was represented by a single uncomplicated symbol all pupils with one exception were able to equal the mean score or better when measured according to mental grade.

TABLE 20

DISTRIBUTION OF SCORES IN ASSOCIATIVE LEARNING ACCORDING TO MEAN, LOW AND VERY LOW CATEGORIES

	Visual - Visual		Auditory - Visual	
	A1	A2	B1	B2
Mean	22	5	23	18
Low	1	3		4
Very Low		15		1

For this group, attempting to learn words by visual means alone is apparently not the most efficient technique.

Auditory-Visual Test, B2, where the learning of visual symbols represented by word-like characters were reinforced through auditory association, 78.1 percent of the group equalled the mean score. In Visual-Visual Test, A2, where words and symbols were associated entirely by visual means, only 21.7 percent of the total group reached the mean score while 65.2 percent were found in the Very Low Category.

Comparison of performance for the group and individuals on the tests of Associative Learning

An analysis of performance in the Associative Tests showed that Visual-Visual Test, A1 and Auditory-Visual Test, B1, both of which used a single figure which did not resemble a word as the symbol, showed a high standard of performance for the group. Auditory-Visual Test, B2, which used characters which resembled words as symbols and where the association of meaning was auditory was only slightly below the performance standard set in Tests A1 and B1. A different pattern of performance was observed in Visual-Visual Test, A2. This test used complex word-like characters as symbols and visual perception as the associative learning technique. The pattern of performance on this test showed a marked decrease in efficiency.

Summary of findings

It appeared from an analysis of the types of performance for the test group in associative learning that organic deficiencies of the associative type were not impeding the students' ability to learn words.

The difficulty for this group of extremely retarded readers seemed to be a deficiency in applying the techniques of visual perception to word-like characters.

SCHONELL'S GRADED WORD SPELLING TEST

A number of studies have shown that reading vocabulary, comprehension and rate were all positively correlated with spelling and that the correlations were relatively high. (Hildreth, 1959, p. 29), (Kottmeyer, 1959, p. 20), (Gates, Russell, 1940, p. 8). Even though the graphic symbols and oral elements are identical, the mental and associative processes used in reading and spelling are the reverse of each other. In reading, the task is to recognize the sounds of the letters and letter combinations recurring in the printed words; in spelling, the letters that represented the sounds which make up the words to be written must be recalled.

Description of the test

Schonell's Graded Word Spelling Test A was administered in an effort to discover patterns of the association of sounds with their written form.

This test was composed of a scientifically selected sampling of one hundred words of increasing difficulty from first through tenth grades. Results could be calculated as Spelling Age or Spelling Grade by the use of the test norms. These test results had been found by extensive use to closely approximate age and grade scores obtained on the Schonell Graded Reading Vocabulary Test and the accuracy score of

the Neale Analysis of Reading Ability. This test was given according to specified directions and then was continued as a power test so that patterns of response to the individual items could be studied.

Procedure in testing

Results on this test in terms of spelling ages in years and tenths of a year were converted into years and months for purposes of comparison with other tests in the series. The number of errors for each word as well as the specific types of errors were recorded. To determine possible patterns of spelling performance the types of errors were then analysed by the application of the Spache formula as follows:

a) omission of a silent letter
b) omission of a sounded letter
c) omission of a doubled letter
d) addition by doubling
e) addition of a single letter
f) transposition or reversals
g) phonetic substitution for a vowel
h) phonetic substitution for a consonant
i) phonetic substitution for a syllable
j) phonetic substitution for a word
k) non-phonetic substitution for a vowel
l) non-phonetic substitution for a consonant
m) unrecognizable or incomplete

In addition to Spache's list, two more types were added so that closer comparisons could be made with the results of analysis of other

tests involving types of word perception. These were the following:

n) omission of a suffix

o) addition of a suffix

Total errors of all types were recorded and arranged in sequential order for purposes of comparison. (Table 23)

Individual results of the analysis of Schonell's Graded Word Spelling Test for each member of the group

Twelve students attempted some words past the fifth level. Eleven students attempted most of the words in levels six through eight. Thirty-six of the attempts were correct. When individual spelling grades were compared with mental ages the amount of retardation varied from two years and seven months for student number 23 to seven years and nine months for student number 10. Differences for each student are shown in Table 21.

Group results of the Schonell's Graded Spelling Test

Correct responses for the group was 32.8 percent of the number possible. No attempt was made to discourage any student in the group from attempting to write words past the limit of his orthographic accuracy.

The words of this test were graded in difficulty so that each successive ten words which were spelled correctly raised the spelling score by one grade. For convenience in comparing the individual and group performances so that qualitative as well as quantitative results could be examined, each successive group of ten words was referred to as

TABLE 21

SCHONELL SPELLING GRADES COMPARED WITH MENTAL AGES TO SHOW THE AMOUNT OF RETARDATION FOR EACH STUDENT

Case Number	Mental Age	Spelling Age (Schonell)	Amount of Retardation (Years)
1	13.3	9.5	3.10
2	13.3	8.1	5.2
3	15.5	8.11	6.6
4	14.3	9.5	4.10
5	14.10	9.0	5.10
6	11.11	6.11	5.0
7	12.9	7.10	4.11
8	13.3	7.10	6.5
9	14.2	8.7	5.6
10	14.4	6.7	7.9
11	14.7	7.7	7.0
12	15.9	9.4	6.5
13	13.1	7.5	5.8
14	16.0	9.4	6.8
15	13.3	9.7	3.8
16	12.6	8.2	4.4
17	12.6	8.1	4.5
18	12.4	9.4	3.0
19	14.1	8.2	5.11
20	12.4	6.10	5.6
21	12.2	6.7	5.7
22	12.5	8.7	3.10
23	11.5	8.10	2.7

a "level". A frequency table of correct responses (Table 22) reveals that only four words were written correctly by all of the students. Two of these words were at the first level, one each was at the second and

TABLE 22

FREQUENCY AT CORRECT RESPONSES AT EIGHT LEVELS OF THE SCHONELL'S GRADED SPELLING TEST

Level 1	Frequency	Level 2	Frequency	Level 3	Frequency	Level 4	Frequency
net	16	let	16	land	23	ground	15
can	23	doll	18	how	22	lowest	13
fun	18	bell	21	your	21	brain	11
top	23	yes	22	cold	20	write	12
rag	12	then	20	talk	18	amount	13
sat	21	may	21	flower	15	noise	6
hit	19	tree	23	son	17	remain	8
lid	12	by	18	seem	17	hoped	12
cap	22	ill	19	four	20	worry	3
had	20	egg	19	loud	10	dancing	10

Level 5	Frequency	Level 6	Frequency	Level 7	Frequency	Level 8	Frequency
damage	11	concert	3	liquid	0	accordance	0
else	3	domestic	4	assist	1	mechanical	0
through	4	topic	2	readily	1	anxious	0
entered	8	method	0	guess	2	signature	1
cough	3	freeze	4	attendance	1	allotment	0
fitted	6	avoid	2	description	1	approval	0
spare	0	duties	3	welfare	3	accomplished	0
daughter	5	recent	6	various	0	remittance	0
edge	2	type	2	genuine	0	financial	0
search	0	instance	0	interfere	0	capacity	0

third levels. The fact that a word was phonetically regular did not seem to be the main criteria for successful spelling. For example, the word "write" listed at the fourth level had the same number of errors as the words "rag" and "lid" both at the first level.

An examination of the types of errors for the total group was made using the rules for the classification of misspelled words as listed by Spache (1940). To the thirteen items in the Spache list were added "omission of a suffix" and "addition of a suffix" to facilitate comparisons with other tests. These were listed in order of frequency as is shown in Table 23.

The use of the Spache formula gives total errors rather than total misspelled words. The average number of errors within a word was 1.8.

The proportion of unrecognizable or incomplete words was possibly due to the fact that all students were allowed to attempt the complete test.

Reference to Table 21 showed that the range in spelling age for the group was from 6.7 years to 9.7 years. The mean spelling age was 8.2 years. Additions of a single letter accounted for almost as large a proportion of errors as incorrect vowels. The types of additions most commonly recorded were:

a) a final 'e' added to a word which did not require it
as "rage -- rag"

b) a vowel digraph used in place of a single vowel letter
as "eagg -- egg"

The general trend of performance appeared to be additions of

extraneous letters rather than omissions, especially where phonetic substitutions were attempted for syllables and vowels. Examples of these additions were observed in such attempts as:

likwood -- liquid

dooteas -- duties

Another noticeable pattern of performance was evidenced by the number of confusions in the use of 's' and the soft sound of 'c'.

TABLE 23

FREQUENCY OF SPELLING ERRORS AS CLASSIFIED BY THE SPACHE FORMULA

Rule Number	Type of Error	Frequency
13	Unrecognizable or incomplete	382
11	Non-phonetic substitution for a vowel	197
5	Addition of a single letter	171
9	Phonetic substitution for a syllable	111
1	Omission of a silent letter	110
3	Omission of a doubled letter	99
8	Phonetic substitution for a consonant	92
7	Phonetic substitution for a vowel	87
12	Non-phonetic substitution for a consonant	76
2	Omission of a sounded letter	57
4	Addition by doubling	20
6	Transpositions or reversals	20
14	Omission of a suffix	8
15	Addition of a suffix	6
10	Phonetic substitution for a word	0
	Total errors of all types	1435

Thirty-seven instances of the use of 's' in place of 'c' and sixteen instances of 'c' in place of 's' were recorded. This group had been retaught the phonetic principle of the soft sound of 'c' shortly before the tests were given. It appeared that many students remembered the rule but were not able to apply it in specific instances. The result was errors such as the following:

cpair -- spare

inctins -- instance

cerch -- search

Comparison of performance on Schonell's Graded Spelling Test for the group and individual students

In this test of words written from dictation the greatest number of errors were caused by non-phonetic substitutions for vowels. Many of these were the result of lack of association between short vowel sounds and their symbols. This resulted in many errors such as the following:

set, sit -- sat

fan -- fun

The most noticeable pattern of performance for all of the students throughout the test was the number of correct beginning letters which were used compared to the number of recognizable attempts. Almost all attempts used the correct beginning letter. In many of the remaining attempts a letter which sometimes had a similar sound such as 'j' for 'g' or 'c' for 's' were frequently substituted. Additions of extra letters, either as final letters or as a substitution for syllable or vowel sounds

was common. Errors of omission were most frequently confined to silent letters.

Summary of findings

A range of over five years was observed in spelling results for the group. Non-phonetic substitutions for vowels, and to a lesser extent, consonants accounted for the majority of the errors. This was evidenced in the fact that phonic regularity did not necessarily affect the results. The group showed a tendency to add extra letters rather than make omissions. Confusions of consonants which were sometimes sounded alike, such as 's' and 'c', were prominent.

SUMMARY OF SPECIFIC FINDINGS IN EACH TEST AREA

The first procedural step involved an analysis of performance on each separate test. Results of the behaviour of the group and individuals in each test area were as follows:

Sight Vocabulary and Word Recognition (timed)

1. Beginnings of words were most consistently recognized.
2. Configuration was much used.
3. With polysyllabic words at the division two level, span of perception often did not go beyond the first syllable. Many attempts at pronunciation ended in partial words.
4. Past the level of basic sight word recognition, meaning became of secondary importance. Monroe (1932, p. 132) stated that this type of substitution was common

at later levels when the context becomes too fragmentary to be of use.

5. Vowel errors were present in approximately one-quarter of the incorrect attempts. This was also noticeable in cases described by Harris (1947, p. 514).

Word Recognition (untimed)

1. Beginning letter or letters was the most consistently correct part of words.
2. Beginning with the level at which it was necessary to apply word attack skills, nonsense words rather than meaningful words appeared to predominate.
3. Prefixes tended to be recognized as units.
4. Suffixes were correct in less than half the attempts.
5. Errors for suffixes were specific rather than general. The most commonly omitted or misread suffixes were 's' or 'es'.
6. Vowel errors were present in approximately one-third of the total incorrect attempts. This proportion was fairly constant at each level. Bond (1957, p. 420) stated that vowel errors were among the major sources of difficulty.

Oral Reading

1. All students in the group were reading too quickly for their ability in accuracy.
2. Substitutions of meaningful words accounted for the majority of errors in accuracy.

3. Lack of versatility in word attack and lack of ability to apply word attack skills with precision seemed to be responsible for low group scores in both accuracy and comprehension.
4. Word attack appeared to consist of recognition of the beginning letters and a guess at the remainder of the word.
5. At the easier levels there was a strong tendency to ignore the details of words completely in order to make meaning.
6. At the later levels when attention was given to details of word form, meaning was lost.
7. Proportion of vowel errors was reasonably consistent -- about one-third of the number of errors at each level.
8. Many prefixes and some suffixes were recognized as units.
9. Errors were specific rather than general. Although suffix errors were frequent, a specific suffix such as 'ing' seemed to be recognized as a unit by most of the group.
10. Inference questions seemed to be more accurately answered than fact questions.

Silent Reading

1. Many subjects vocalized as they read silently.
2. Fact questions were answered more accurately than inference questions.
3. Rate did not appear to affect accuracy in the majority of cases.

Letter Names and Sounds

1. No students could give a correct sound to all letters of the alphabet.
2. Errors in letter sounds were specific to a small group of letters rather than general to all letters.
3. In sounding the letters, vowels were the most troublesome.
4. In naming letters, consonants caused the most difficulty.

Reading Aptitudes

1. Group results were highest in the test of crossing out letters.
2. Group results were lowest in the test of copying text material.
3. Both the highest and lowest group results were obtained in the two tests of motor aptitude.
4. The two tests which appeared to be most similar in profile of performance were Visual Letter Memory and Copying Text.
5. Results on the two tests of visual performance showed a wide range in both group and individual performance, in favor of Visual Form Memory.
6. The majority of scores for the group were in the inferior category.

Associative Learning

1. No apparent organic deficiency in learning by association was noted.

2. The particular difficulty for this group was the forming of associations when all stimulation was visual and the figures resembled words.

Spelling

1. Greatest number of errors were non-phonetic substitutions for vowels.
2. There was a tendency to elaborate rather than to simplify substituted word elements.
3. In many instances, application of skills was at fault rather than lack of knowledge of the skills themselves.

SUMMARY OF GENERAL FINDINGS

When the results of the analyses of the tests for the group and for individual students were examined, some general findings seemed to appear. The most significant of these were summarized below:

1. Level of difficulty of material was not a criteria of success.
2. Number of years in school (presumed exposure to reading material), did not appear to affect the quality of performance.
3. Ability to generalize from known examples was weak for the group. Specific items rather than general areas caused the most difficulty.
4. Tests involving manipulation of either letter and words or simulated forms of these had consistently low results.
5. Tests involving memory of letter sequence had low results.
6. Perception of word beginnings was consistently high in both word recognition and spelling.

CHAPTER SUMMARY

When a review of the test findings was made a wide variety of performance results was evident. This inconsistency was more apparent in individual test results than in the results for the group as a whole and appeared to depend on specific factors required for the test performance rather than the general skill which the test was designed to measure. Although the sub-test of Copying Text from the *Monroe-Sherman Aptitude Tests* was designed to measure an aspect of kinaesthetic aptitude, the results depended on the ability to remember words and letters in their correct order as much as they did on motor coordination.

The greatest difficulty for all members of the test group was the inability to coordinate a number of tasks which had to be performed simultaneously for satisfactory reading and spelling results.

CHAPTER IV

COMPARISONS OF PERCEPTUAL PERFORMANCES OF THE GROUP AND INDIVIDUALS ON SELECTED GROUPS OF TESTS

It was the purpose of this chapter to compare individual and group performances on selected groups of tests in an effort to find indications of similarities and differences in these performances. The groups of tests were selected as they applied to the following areas: (a) visual perception (b) auditory perception (c) kinaesthetic perception (d) auditory - visual - kinaesthetic perception (e) comprehension. Analyses of the performances were compared and findings were summarized.

The results of the various tests were reported in a number of different ways, among them reading ages, grade scores, percentiles, raw scores and performance on individual test items. An attempt was made to compare the various test results by using percentages of total scores. However, the results obtained by this method proved to be misleading because percentages as such were not comparable from the stand point of performance. For example, a score for the group of eighty percent in visual letter memory would be rated as a superior performance, while the same score of eighty percent in the test of naming letters would be indicative of inferior performance by the group for that test. Because of the difficulties involved in comparing total scores of the various tests, comparisons of individual and group performance items were made. Among items so compared were those which tested recognition

of letters and words, memory for letters and words, visual-kinaesthetic coordination and comprehension. Trends of total test performances for the group and individuals were also compared where possible in an effort to discover patterns of behaviour.

As stated in the purpose of this study, the possibility of the existence of patterns of performance in the areas of visual, auditory and kinaesthetic perception were explored. The selection of groups of tests for comparison was made according to their measure of these perceptual areas. Because none of the tests used were "pure" measures of any one perceptual field, the interaction of visual-kinaesthetic and visual-auditory-kinaesthetic perception in selected groups of tests was compared. Comprehension of various types of material was also examined.

VISUAL PERFORMANCE

Comparisons were made of visual performance which involved recognition of letters and letter-like forms, words and word-like forms and visual memory.

Letters and letter-like forms

Of all the tests which were administered only the Visual-Visual sub-tests A1 and A2 of the Gates Associative Learning Tests required a purely visual learning performance with a verbal response. The sub-tests of Visual Letter Memory and Visual Form Memory of the Monroe-Sherman Aptitude Tests also required visual learning performance but each pupil recorded his responses by the use of motor skills -- in the first case by the reproduction of letters and in the second case by the reproduction of abstract forms.

Since the results for the Gates Associative Learning Tests were recorded in the three broad categories of Mean Scores, Low Scores and Very Low Scores compared with mental grade while the results of the Monroe-Sherman Aptitude Tests were recorded in percentiles equated with chronological age, comparisons were made on the basis of group and individual performances.

In both tests which required visual perception of single geometric forms group results were high. In the Gates Test which required that the learning take the form of a verbal response to the visual association of a symbol and a picture, the results with only one exception, case number 15, were equal to or better than the Mean Score as compared with each student's mental grade. (Table 18) In the Monroe-Sherman Test of Visual Form Memory the students drew from memory the abstract shapes which they had attempted to learn by visual means. In comparison with the group percentiles of other sub-tests in the Monroe-Sherman Aptitude Tests the group percentile for the sub-test of Form Memory was also reasonably high. (Figure 1)

When individual performances on the two tests were compared the results tended to vary. Of the two students who scored above the ninetieth percentile on the test of Visual Form Memory one was able to achieve a perfect score on the Gates Associative Learning Tests, Visual-Visual A1 on his second trial. The other did not achieve the same result until his fourth and final attempt. Of the seven students in the inferior category on the Monroe-Sherman Test, one of these students achieved a perfect score in his second attempt on the Gates Test.

Although the group as a whole tended to perform well in situations which required the association of meaning with simple geometric figures and the graphic reproduction of similar types of figures only a small number of individuals within the group were able to perform consistently in both.

Words and word-like forms

Tests which required visual perception of word-like forms were the Gates Associative Learning Tests, Visual-Visual A2 and Monroe-Sherman Aptitude Tests, Letter Memory. The results of both of these tests showed inferior group performances. On the Gates Test which required the association of word-like symbols with pictures, 78.2 percent of the group scored in the Low and Very Low categories when test results were compared to mental ages. In the Monroe-Sherman Test which required the writing of a series of letters from memory, 86.0 percent of the group performed in the inferior percentile range.

A comparison of individual results showed that while the three students who scored within the average percentile range on the Monroe-Sherman Test were all in the Very Low category on the Gates Test, the five students who attained a Mean score on the Gates Test were all rated in the inferior percentile range on the Monroe-Sherman sub-test of Visual Letter Memory. It was noted that performance on the test which required the writing of letter symbols was the most inferior for the group as a whole. (Figure 1)

Visual Memory

On the tests which were given it was not possible to measure visual memory without also measuring visual perceptual abilities, therefore the tests which were compared in the foregoing section for visual perception were again examined for visual memory. To these were added the sub-test of Copying Text from the Monroe-Sherman Aptitude Tests. Results on this sub-test depended to a large extent on the ability to keep in mind the sequence of letters in the words of the text in large enough memory groups to facilitate copying the test material at a suitable rate.

Four of these sub-tests made use of abstract forms and two used letter symbols.

For the group as a whole performances on the sub-tests which used abstract symbols was more satisfactory than on those which used letter symbols. In both tests which used letter symbols it was required that the letters be written in their correct order. In the tests which made use of abstract symbols order was not considered. In many individual cases low scores on the sub-tests involving letters resulted from the inability to remember the correct sequence of letters or the omission of letters from the sequence rather than from inability to remember the letter forms.

Summary of visual performance

In tests which involved visual perception of abstract forms results for the group were high. When visual perception of words and

word-like forms was required group performance was inferior. For the group as a whole, visual memory for abstract forms was better than that for word forms. Individual results on all tests tended to fluctuate.

AUDITORY PERFORMANCE

Results of auditory performance in tests which involved orientation and discrimination of letter sounds and auditory memory were compared.

Letter sounds

Of all the tests given to the group which purported to measure auditory perceptual ability, only one, the sub-test of Orientation and Discrimination from the Monroe-Sherman Aptitude Tests, came close to doing this without having the student combine visual and auditory abilities to obtain a result. In this test the examiner dictated four words. The child was asked to circle one of four marks which indicated the position of one of the words which had previously been chosen by the examiner. Two aspects of auditory performance were tested -- discrimination of minute differences of letter sounds within each word and the position of the chosen word in the list of four words which were pronounced. Both of these abilities were of equal importance to the results of the test. When the percentile was computed for the total group it was found that the result for this important auditory skill was slightly below the normal percentile range. (Figure 1)

Individual results showed one student as having achieved the superior percentile range while twelve students were in the inferior range. (Table 17)

Auditory Memory

It was not possible to segregate the memory factor from other auditory performances. However, since memory was a factor in all tests of auditory performance the following tests were examined in an attempt to discover the affect of auditory memory on performance:

Monroe-Sherman Aptitude Tests, Auditory Letter Memory
Gates Associative Learning Tests, Auditory - Visual Test B1
Gates Associative Learning Tests, Auditory - Visual Test B2

In the test of Auditory Letter Memory the student was required to keep in mind the names and sequence of the letters in nonsense words spelled aloud by the examiner. The letters were then written from memory by each student. Placing the letters in their correct order was just as difficult a task for many of the students as remembering the actual letters to be written. Most of these reversals in order occurred in the medial portions of the nonsense words. Many other students were able to keep in mind only the first two or three letters. Still others remembered the first and last letters but details of the medial portions of words could not be retained.

The Gates Associative Learning Test, sub-tests Auditory - Visual B1 and Auditory - Visual B2, also made use of a memory factor. In these tests each student attempted to remember the association between an abstract symbol and a word spoken by the examiner. Here, as in the Test of Visual Memory, the number of symbols had a direct effect on the speed with which the individual student remembered the associations. In Auditory - Visual Test B1, in which one simple symbol had to be kept in

mind, two of the students remembered the complete sequence of ten associations after only one presentation. In Test B2, where the symbols were long enough to represent four letter words, ten of the students were unable to remember the sequence even after five presentations.

An interesting observation was made of two students who made auditory reversals. When the words "saw" and "top" were spoken by the examiner, the words associated with the symbols by the students were "was" and "pot". Since the students had only heard these words and not seen them these reversals must have been auditory-mental.

Summary of auditory performance

In tests which required the auditory perception of letter sounds the results for the group were slightly below the normal percentile range. Most of the difficulty with auditory memory was the result of inability to remember the correct order of medial letters. Individual results showed wide variations in performances.

KINAESTHETIC PERFORMANCE

The two tests of kinaesthetic performance which were compared were both sub-tests from the Monroe-Sherman Aptitude Tests -- Copying Text and Crossing-Out Letters. The test of copying textual material involved memory of letter and word forms as well as the hand-eye coordination involved in writing these words from the copy. The test of Crossing-Out Letters involved keeping one single letter in mind, differentiating this shape from groups of background letters and coordinating the hand and eye movements sufficiently well to cross out

the chosen letter each time it was discerned. Both tests were timed.

When group performances on the two tests were compared the results of the test of Crossing-Out Letters was superior to the test of Copying Text. Only two students performed poorly in both tests. With certain individual students an extreme variation in scores was observed. As shown in Table 17, two students, case numbers 13 and 20, scored below the tenth percentile in the test of Copying Text and above the eighty-fifth percentile in the test of Crossing-Out Letters.

Causes of difficulty

Some of the low scores in the test of Copying Text were apparently caused by various combinations of the following difficulties:

a) inability to make correct letter forms;
b) short memory span for letters;
c) omission of punctuation;
d) confusion of manuscript and cursive letter forms;
e) omission of words;
f) substitution of words for those in the text.

Letter forms

Because group performances on all tests which involved the writing or copying of letters and words were consistently low, comparisons were made of the written forms of letters and words in all tests which required this type of response. When individual performances were examined several of the difficulties observed in copying words and letters from a text were also noticeable in other tests which required

written responses. The same students who confused manuscript and cursive letter forms in copying from a text also confused the same forms in writing letters from memory in the tests of auditory and visual letter memory. Details of letter forms were more often omitted in the test where the copy was in view than in the tests in which the letters were written from memory. This may have been due to the fact that the test of copying text was timed. Many more reversals of the order of letters was made in the tests in which the letters were written from memory. Substitutions of the letters 'm' and 'n', 'b' and 'd' were present in the tests of memory but not in copying text.

Word forms

When kinaesthetic performance on Schonell's Graded Spelling Test was compared with written responses on other tests, inaccuracies in making letter forms was one of the most consistent faults. Unfinished forms were among the most prevalent of the difficulties. In this test, as in the test of Copying Text, capitals and lower case letters were often misplaced. In both tests which involved the writing of words a number of students had difficulty in joining letters to make smooth word forms.

Summary of kinaesthetic performance

Results for the group were low in all tests which involved copying or writing words and letters. Reversals of letters were common when these were written from memory but details of letters were often omitted when the copy was in view. Simple hand-eye coordination such as was necessary in the test of Crossing-Out Letters appeared to be reasonably

well performed. When the kinaesthetic performance included the ability to remember and reproduce letters and words group results were low. In all the tests which involved writing, lack of rhythmic hand-eye coordination seemed to be responsible for many of the difficulties in both rate and pattern of performance.

AUDITORY-VISUAL-KINAESTHETIC PERFORMANCE

Since a majority of the test materials necessitated the use of a combination of auditory, visual and kinaesthetic skills, this section examined the auditory-visual-kinaesthetic perceptual abilities necessary for the recognition of letters and letter-like forms in the following group of tests:

Neale Supplementary Diagnostic Test 1, Letter Sounds and Names
Temple University Basic Vocabulary Test
Monroe-Sherman Aptitude Tests, Auditory Letter Memory
Schonell's Graded Word Recognition Test
Neale Analysis of Reading Ability, Accuracy Sub-test
Schonell's Graded Spelling Test
Gates Associative Learning Tests, Auditory-Visual Test B1

Comparisons of auditory-visual-kinaesthetic perceptual behaviour in the recognition of words and word-like forms was made using the following group of tests:

Gates Associative Learning Tests, Auditory-Visual B2
Temple University Basic Vocabulary Test
Schonell's Graded Word Recognition Test
Neale Analysis of Reading Ability, Accuracy Sub-test
Schonell's Graded Spelling Test

Recognition of letters and letter-like forms

Most of the difficulty with the auditory and visual recognition of letters arose from the inability of the students to associate visual symbols with their correct sounds. This was especially true of the vowel letters. Reference to Table 13 will show that inaccuracies in supplying vowel sounds accounted for almost half of the total errors in the test of letter sounds. When the letter names test was compared to the Monroe-Sherman sub-test of Auditory Letter Memory the three students who had the most difficulty in naming the letters from sight seemed to have no particular difficulty in writing the letter forms from dictation. The error which was common to all three of these students was reversals of the order of pairs of letters. This was also one of the most frequent types of errors for the group as a whole. Although all students in the group had given the correct names to the letters 'm' and 'n' when responding orally, these two letters were the most frequently confused when they were written from dictation. These were confused on fifteen occasions. Other confusions which occurred more than once were 'i' and 'y', 'a', and 'e'. Because of the similarity in the sound of each of these pairs of letter names it was reasonable to suppose that these errors may have been due to inaccurate auditory discrimination rather than faulty auditory memory.

As was previously discussed, the Neale Supplementary Diagnostic Test I, sub-test of Letter Sounds, (Table 13) had revealed that most of the faulty associations of sounds and their symbols were due, not to a general disability, but specifically to vowel sounds and letters. This

difficulty with vowels was evidenced in all tests in the series which required either the reading of letters and words or the writing of these from dictation.

The Schonell's Graded Spelling Test required that the letters be heard as sounds included in words before being written. An examination of the results of this test revealed only five instances of partial reversals in the order of sounds being written. Some examples were:

clow -- cold
eged -- edge

This unexpectedly low proportion could have resulted from the fact that it was necessary for the pupils to listen to the syllables and sounds, and attempt to translate these into symbols before attempting to write the words. Schonell (1942, p. 462) attributed this to the value of the manual cue in learning words. Several of the errors that appeared to be reversals could possibly have been termed phonetic substitutions.

Of all the tests given, the dictated spelling, Schonell's Graded Word Spelling Test, seemed to require the closest association of visual, auditory and kinaesthetic performance. In this test, as in the Neale Test of Letter Sounds, a large portion of the errors was caused by the incorrect auditory-visual and kinaesthetic association of vowel sounds and their symbols. This difficulty with vowel sounds was also evident in the several reading tests which were given. Among those tests in which vowel difficulties were responsible for a large proportion of errors were the Temple University Basic Word Recognition Test, Schonell's Graded Reading Vocabulary Test and the Neale Analysis of Reading Ability - Accuracy Sub-test.

When the scores of Gates Associative Learning Tests, Auditory-Visual B1 were examined the visual association of simple abstract forms with spoken words did not seem to present an undue amount of difficulty for this group of students. All scores were above the Mean Score when compared with the students' mental grades. Three students learned the complete series after only one presentation while six students required only two presentations.

Words and word-like forms

The Gates Auditory-Visual Test B2, in which abstract symbols which resembled four letter words were associated with spoken words, was also reasonably well performed by the majority of the group members. Only one student's score was recorded in the Very Low category when compared to his mental grade. (case number 9). This same student had learned the complete sequence of auditory-visual associations in three presentations of the B1 section of the test which used forms which did not resemble letters and words. This same student performed poorly on other tests which required either auditory or visual performance involving letters and words. Some emotional reaction to letters and words on the part of this student may be indicated. (Table 18).

The perception of words was also compared in the tests which required oral reading of words in lists and in context in an attempt to find similarities or differences in the performances of the group and individuals. The following tests were examined:

Schonell's Graded Reading Vocabulary Test

Neale Analysis of Reading Ability, Form A, Accuracy Sub-test

Temple University Word Recognition Skills

Schonell's Graded Reading Vocabulary Test was an untimed test of the application of word recognition skills out of context. The Neale Analysis of Reading Ability was a timed test of word recognition skills which included the use of context clues. The results of these two tests were arranged in order of Schonell reading age. This comparison is shown in Table 24.

When results for the group were compared, a much wider range of ability was apparent when words were read from a list than when the words were read in context.

At the higher reading ages as measured by the Schonell Vocabulary Test, the reading ages on the Neale Accuracy Test were progressively lower until approximately mid-point when the scores on the two tests showed very small differences. At the lower reading ages as measured by Schonell the reading ages for accuracy as measured by Neale were from two to ten months higher. The level at which the two tests seemed to converge was approximately beginning third grade. It appeared that word attack skills which were being applied to words in a list were not being transferred to use in context material. The difference between the scores on the two tests was considerably greater at the upper levels than at the lower levels.

The scores in the tests of word and story reading were also compared with the Schonell's Graded Spelling Test scores.

When the reading ages as measured by Schonell's Reading Vocabulary Test and Schonell's Graded Spelling Test were compared it was observed that the results of the two tests were reasonably close. Only

TABLE 24

COMPARISON OF RESULTS OF SCHONELL'S GRADED VOCABULARY TEST AND NEALE ANALYSIS OF READING ABILITY -- ACCURACY SUB-TEST ARRANGED IN ORDER OF SCHONELL READING AGE

Case Number	Schonell's Reading Age	Neale Reading Age	Difference
18	10.0	8.3	+ 1 yr. 9 mo.
14	10.0	8.5	+ 1 yr. 7 mo.
12	9.8	8.6	+ 1 yr. 2 mo.
1	9.8	8.2	+ 1 yr. 6 mo.
22	9.2	8.9	+ 5 mo.
11	9.1	7.10	+ 1 yr. 3 mo.
2	9.0	8.2	+ 10 mo.
4	9.0	8.9	+ 3 mo.
19	8.11	8.5	+ 6 mo.
9	8.6	8.2	+ 4 mo.
3	8.6	8.0	+ 6 mo.
16	8.5	8.2	+ 3 mo.
5	8.1	8.0	+ 1 mo.
7	8.1	8.3	- 2 mo.
8	8.0	7.10	+ 2 mo.
15	7.10	7.10	0 mo.
23	7.7	7.5	+ 2 mo.
17	7.6	7.11	- 5 mo.
13	7.2	7.6	- 4 mo.
20	7.1	7.3	- 2 mo.
6	7.1	7.10	- 9 mo.
10	6.7	7.0	- 5 mo.
21	6.2	7.0	- 10 mo.

five scores varied more than eight months. The majority of the scores were in favour of word attack rather than spelling skill.

When the Neale Accuracy and Schonell Spelling test results were arranged

in order, individual scores showed that approximately half the group were better in reading than in spelling. The children with the three lowest scores in reading were also those with the lowest scores in spelling. (Table 24) There was a noticeable tendency for the individual low scores on these two tests to show a closer comparison than the high scores.

The reading and spelling tests were also compared with the Monroe-Sherman Aptitude Tests in an attempt to determine the effect of aptitude on reading and spelling performance. Neither group nor individual scores in reading or spelling seemed to be affected by total aptitude performance. However when reading scores were compared with the number of Monroe-Sherman scores which were recorded in the inferior category it was noticed that the group results were fairly consistent. Several individual scores showed a considerable amount of variation. Spelling results for both group and individual performance did not appear to be affected by the number of inferior scores on the Monroe-Sherman Aptitude Tests.

Summary of auditory-visual-kinaesthetic performance

Each of the tests used to measure auditory, visual and kinaesthetic perception required the use of a combination of two or more of these perceptions. In tests of naming letters, difficulties which were encountered when letters were written from dictation were not necessarily present when the letters were named from a text. The apparent inability of the students to associate visual, and, to a lesser extent, auditory symbols with their correct sounds accounted for the majority of errors

in sounding, naming and writing words and letters. Mispronunciation or omission of vowel sounds and letters was the most prevalent error in all tests which required the reading of words and letters or the writing of these from dictation. Auditory-visual associations of symbols other than words and letters presented no apparent difficulties for the majority of the students. Approximately one-half of the group were better in reading than in spelling. Considerable variation was observed among individual scores when performance was compared with aptitude.

COMPREHENSION

Three of the tests in the battery were given to compare group and individual performances in comprehension skills of oral reading, silent reading and oral language. These were as follows:

Neale Analysis of Reading Ability, Form A, Comprehension Sub-test

Neale Analysis of Reading Ability, Form B, Comprehension Sub-test

Monroe-Sherman Aptitude Tests, Oral Language

When Neale Analysis of Reading Ability, Form A - Comprehension Sub-test in oral reading and Neale Analysis of Reading Ability, Form B - Comprehension Sub-test in silent reading were compared earlier in this chapter it was noticed that the students seemed to be more accurate in their answers to factual types of questions when they read content material silently. When content of a parallel level of difficulty was read orally, inference questions had a higher rate of correct responses. These two tests were compared with the Monroe-Sherman Test of Oral Language. Performance on this last-mentioned test depended on experience with meaningful phrases rather than with story-type material. Ability to choose

meaningful phrases did not seem to correspond with the ability to answer comprehension questions which followed either the oral or silent reading of story-type material.

SUMMARY OF THE ANALYSES OF PERCEPTUAL PERFORMANCES ON THE SELECTED TESTS

Results in the following areas of perceptual performance were summarized as follows:

Visual Performance

1. Results on tests involving visual perception of abstract forms were high.
2. Results on tests involving visual perception of letters and word-like forms were very low.
3. Results of tests which involved memory of sequence of letters combined with visual perception were very low.
4. Reasonably satisfactory results were achieved by the group in tests of visual memory involving abstract forms.

Auditory Performance

1. Group results in discrimination of differences in sounds within words were slightly below the normal range.
2. A large number of partial reversals were evident in tests which involved auditory memory of sequence of letters.
3. In tests of associative learning in which auditory clues reinforced the learning of visual symbols the results varied directly with the amount of resemblance of the symbols to letters and words.

Kinaesthetic Performance

1. Results of tests involving motor activities depended on the type of other activities which were involved and which had to be performed at the same time.
2. Tests which combined kinaesthetic activity and memory for letters and words were poorly performed.
3. Tests which combined kinaesthetic activity and visual perception were poorly performed.
4. Reversals of letters and partial reversals of word forms occurred in tests which involved memory of letter sequence and kinaesthetic activity except in writing of spelling.
5. A large proportion of letter forms were inaccurately made.
6. In all tests which required the writing of letters and words lack of coordination with other perceptual fields caused difficulty.

Auditory-Visual-Kinaesthetic Performance

1. The greatest difficulty seemed to be the association of symbols with their sounds.
2. Vowel sounds and symbols were most frequently confused.
3. Knowing the letter names on a visual test did not guarantee that all students could write the letters correctly from dictation.
4. Visual-auditory association of abstract forms and spoken words presented very little difficulty.

5. A majority of scores were in favour of word attack rather than spelling.

Comprehension

1. Comprehension of factual material was better when the material was read silently. (Most silent reading was sub-vocal or vocal.)
2. Comprehension of inferred or implied material was better when the material was read orally.
3. Knowledge of word meanings in phrases presented orally was better than comprehension of sequential material read in context. This was similar to the finding by Johnson (1957).

CHAPTER SUMMARY

Group results were inferior when visual perception of words and word-like forms was required. When the test material consisted of abstract forms results in visual perception were high. Results for the group in tests of auditory perception were slightly below the normal range. In tests which required the writing of words and letters, group performance was low. When a combination of perceptual activities was required, results of performances were low. Results of tests in all the perceptual areas showed a wide variety of individual performances.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to look for patterns of perceptual performance in test responses of a selected group of severely retarded readers which may be identified as symptoms of reading difficulty rather than causes.

SUMMARY OF THE INVESTIGATION

To carry out the purpose of the study two procedures were followed -- (1) analyses were made of group and individual performances on each separate test (2) analyses were made of group and individual performances on selected groups of tests. In order to do this a battery of tests was selected, each of which would measure some aspect of reading performance. These tests were administered to a group of twenty-three selected students who had exhibited severe difficulty in learning to read. The areas tested were sight vocabulary and rapid word recognition, untimed word recognition; rate, accuracy and comprehension of oral reading; rate and comprehension of silent reading; letter names and sounds; spelling ability; visual, auditory and motor aptitudes for learning; oral vocabulary and associative learning. The results of each test were compiled and item analyses of group and individual responses were made.

When individual and group behaviour for each separate test was examined the data were compared in order to observe patterns of performance. This procedure varied from test to test. For example, some

results were compared with publisher's norms; in others only a comparison of raw scores could be made since no published norms were available. In all but the test of letter names and sounds, the results of sub-tests or items within the total test could be compared. In all tests individual responses to selected items were compared.

To achieve the second purpose, which was to compare group and individual performances on selected tests, a basis of test selection was necessary. Since the hypotheses to be tested were concerned with the three areas of visual, auditory and kinaesthetic perceptual performance, the tests were grouped for comparison of performances in these perceptual areas. In most of the tests several types of perceptual performances were combined. This resulted in the tests being divided into five comparative groups as follows: visual, auditory, kinaesthetic, auditory-visual and comprehension. Comparisons of the incidence of certain types of responses within each group were made. Analyses of all comparisons were made to look for trends in performance and possible behaviour patterns in each perceptual field.

SUMMARY OF FINDINGS FOR INDIVIDUAL PERFORMANCES

When test results for individual members of the group were examined and compared the following were the most significant findings:

1. Consistency in performance and results on the separate tests was lacking for individual students. This was similar to findings by Monroe (1932, p. 29) in which wide discrepancies among the various reading skills were noted in the performances of severely retarded readers.

2. Individual performances in achievement tests did not usually compare with individual performances in aptitude tests.
3. The presence of one or more high scores in aptitude or associative learning did not appear to affect the learning of letters and words for individual students.

SUMMARY OF FINDINGS FOR GROUP PERFORMANCES

When total group performances on the various tests were compiled and examined the following findings seemed to apply to the group as a whole:

1. Wide variation in group performances in the separate tests of visual and kinaesthetic perception was observed.
2. Tests which involved perception of words and letters or their simulated forms had consistently low results.
3. Tests which included memory of letter sequence had low results.
4. Ability to make generalizations was weak. This lack of ability to apply known rules to specific items was observed in such examples as the confusion of the hard and soft sounds of 'c' and 'g' even though most of the students were able to state the correct rule.
5. Use of the correct beginning letter or letters in both word recognition items and written spelling was consistently high. Though examples of performances of retarded readers recorded in such studies as those by

Kottmeyer (1959) and Harris (1947) showed a similar result, no specific mention was made regarding this finding. A later study by Robeck (1962, p. 134) described this type of performance as one of the characteristics of the retarded readers who were subjects of this recent study.

6. Results of associative learning tests which depended on visual clues applied to word-like forms was low, whereas application of visual clues to geometric forms was high.
7. Lack of recognition of word endings was consistent for the group.
8. Lack of ability to coordinate the various visual, auditory and kinaesthetic perceptual tasks which had to be performed simultaneously was a common factor which appeared to cause the greatest difficulty for the group.

CONCLUSIONS

A review of the tests which were intended to measure certain areas of performance showed a wide variety of abilities for the group and for individuals. In some instances tests which had been selected to measure the same skill showed little evidence of comparative performance while other groups of tests showed similar types of behaviour. Individual results tended to show a greater amount of inconsistency than group results for the same area of performance. This may have been due to the nature of the selected tests as measures of these areas of perception rather than on the factor of student performance alone.

Differences in group and individual performance seemed to depend on specific factors required for the performance of a test rather than the general skill which the test was designed to measure. For example, tests which measured memory of simple, abstract forms showed a consistently high degree of performance while similar tests in which the forms resembled letters and words were poorly performed. For the group as a whole, tasks which required memory of a sequence of letters were poorly performed. Speed of response seemed to affect the type of group performance in tests which involved perception of words. Different types of performances were observed when similar skills were performed under timed and untimed test conditions. For example, the proportion of nonsense words appeared to increase in direct proportion to the amount of time which was available for the application of word attack skills.

In spite of the inconsistency of many of the results of individual performances when compared test by test one common factor was apparent. It seemed that lack of ability to coordinate several tasks which had to be performed simultaneously was the greatest difficulty for the students in this group.

The problem which the study had attempted to investigate were concerned with individual and group behavioural patterns in the areas of visual, auditory and kinaesthetic perception. Each question is discussed in the light of the comparisons of performances in and among the several tests.

Will the analysis of test results reveal patterns of visual perception for individuals?

When individual test results of the learning of abstract forms

were analysed a great deal of variation in the performances of individual students was observed. Only a small number of students performed consistently on the tests which were compared. On the tests which compared behaviour the visual perception of word-like forms individual results again showed considerable fluctuation. Many individual low scores in visual memory resulted from reversals of parts of the sequence of letters. This type of reversal was similar to that of subjects in clinical studies by Monroe (1932, p. 69) and Schonell (1942, p. 157).

The conclusion was reached that no consistent pattern of visual perception was apparent for individual students in the group. However, when visual memory of correct sequence of letters was considered a trend towards reversals in the order of parts of the sequences was observed. Good visual memory was considered by Dockrell (1960) as an important requirement for satisfactory performance on the Coding sub-test of the Wechsler Intelligence Test for Children because of the close resemblance of this sub-test to reading and writing. This investigator observed that scores on the Coding sub-test were consistently low for retarded readers.

Will the analysis of test results reveal patterns of visual perception for the group?

On tests which required visual perception of single abstract forms group results were high. This observation was consistent for tests which involved the association of meaning with a geometric symbol as well as for tests which required the reproduction of abstract figures. On tests when the figures to be associated were letters and word-like forms, group results were inferior.

The conclusion was reached that this group of retarded readers were able to perform more satisfactorily on tests of visual perception which involved abstract figures than on tests which required the perception of letter and word symbols. This finding was noted by Stauffer (1947) and Johnson (1957) in studies which included analysis of results of associative learning tests.

Will the analysis of test results reveal patterns of auditory perception for individuals?

Individual results in auditory discrimination of minute differences in letter sounds within words ranged from superior to inferior. When auditory memory of letter sequence was considered, a majority of errors was the result of reversals of portions of the sequences of letters.

The conclusion was reached that no individual pattern of auditory perceptual ability appeared to be present. However when auditory memory for sequence was examined, a trend towards reversals of pairs of letters was noted in more than half of the individual responses.

Will the analysis of test results reveal patterns of auditory perception for the group?

Group results in orientation and discrimination of the differences of sounds in words clustered around the lower range of performance. When memory of letter sequence was observed the results for the group depended on the number and complexity of the symbols to be remembered. Robeck (1962, p. 137) listed poor letter memory as a frequent factor in reading difficulty.

However, no conclusive evidence was noted of a pattern of performance in auditory perception for the group.

Will the analysis of test results reveal patterns of kinaesthetic perception for individuals?

Extreme variations were observed in individual performances on the tests which involved kinaesthetic responses. Tests which combined memory of word and letter forms with graphic reproduction of these forms showed confusion in the writing of letter forms for certain students. These confusions however were not sufficiently numerous to constitute patterns.

No definite pattern of performance for individuals could be ascertained from a comparison of test results involving kinaesthetic responses. A trend was observed in the low ability to transfer letter form memory to all situations which required the writing of words and letters.

Will the analysis of test results reveal patterns of kinaesthetic perception for the group?

Motor responses which did not also involve the memory of word and letter forms showed superior performances for the group. Group performance on all tests which involved writing from memory or copying letters and words was consistently low.

The conclusion was reached that kinaesthetic responses which involved the writing of letter or word forms were poorly performed by this group of retarded readers. De Hirsch (1961, p. 223) made the observation that the visual-motor competence of poor readers was inferior

to that of good ones, although no mention was made in this study of possible differences in response to different types of material.

The necessity for combining various perceptual activities

A further problem which was not anticipated in the original purpose of the study was precipitated by the necessity of combining motor responses with visual and auditory perceptal activities for purposes of observation of these activities. No test was given which required only one type of perceptual activity. The effect of a combination of perceptual performances made a considerable difference to various test results for both individuals and the group. This observation was also made by Glennon (1961) in a study which investigated the relationships between visual motor skills and reading achievement.

The modifications of behaviour which resulted from combinations of perceptual responses varied with the type of material and the method of presentation. This was substantially the same finding as that of Johnson (1957). Better performance in recognition of letters was achieved when the letters were named from sight (visual perception), than when they were written from dictation (auditory perception).

One of the tasks which caused the most difficulty for this group was the association of visual letter symbols with their correct sounds. This difficulty was observed in all the tests which required the reading or writing of letters and words. It was further observed however, that this difficulty tended to be specific to vowel sounds and letters rather than to letters in general. In tests which required a combination of visual, auditory and kinaesthetic performance fewer

reversals were noticed than in tests which required only visual-motor or auditory-motor performance.

Results of associative learning tests varied with the mode of presentation. Higher scores were achieved by a visual-auditory rather than by a visual-visual mode of presentation. Higher scores were achieved on tests which involved abstract and geometric forms than on those which the type of material used resembled words.

In tests which involved the use of word recognition skills, performances of the group and individuals varied with the type of material in which the words were presented. Approximately one-half of the group members were able to recognize words in a list much better than they were able to apply word recognition skills to words in context. Phonetic or structural accuracy of word recognition as compared to word meaning varied with the amount of time allowed for observation of the words. When enough time was given to allow the use of word attack skills a larger percentage of nonsense words resulted. Conversely, on timed word recognition material, accuracy was sacrificed to meaning.

All types of perceptual activities which involved memory of letter sequence were poorly performed by the group. This observation applied to both visual-motor and auditory-motor tasks.

Although the majority of these findings were substantiated by research, several findings were observed which have not been stressed. While the relationship of the memory factor to auditory and visual perception has received considerable attention this important factor has been given little attention in its relationship to kinaesthetic perception. Few studies were discovered which dealt with the affect of certain

forms of test material on perceptual performance. Although test results appeared to be influenced by specific combinations of perceptual performance no study was found which compared the results of various combinations of visual, auditory and kinaesthetic perception on reading performance.

OBSERVATIONS

The findings which resulted from the examination of the tests gave rise to the following observations regarding group and individual behaviour in the test situations:

1. Visual perception is part of every act required in reading or spelling.
2. Kinaesthetic perception (not necessarily tactile) as it involves rhythmic performance is closely connected with auditory-visual perception. Is kinaesthetic performance a link which relates one type of perceptual activity to another?
3. None of the test given in this study were "pure" tests of any one field of perceptual performance. No study was discovered which isolated any one field of perceptual performance. Is it possible to isolate any single aspect of perception for purposes of testing?
4. All tests given in this study involved the memory factor. How much is memory a factor in kinaesthetic performance?
5. Level of difficulty of material was not a criteria of success.

6. Number of years in school (presumed exposure to material) seemed to make little difference to the level of achievement or to mastery of specific test items.

LIMITATIONS OF THE STUDY

The conclusions of this study were governed by a number of limitations resulting from the research design, and choice of tests used to carry out this design as described in Chapters II and III as follows:

1. No control group was used as a basis of comparison of the findings with regard to the performance of this group of retarded readers with any other group of retarded readers or with a group of achieving readers.
2. The size of the population was limited by intelligence quotients, chronological ages and academic achievement.
3. The study was limited to the performance of extremely retarded readers.
4. The tests were limited in scope for each perceptual area.
5. No statistical treatment was given to the test results therefore in many instances quantitative comparisons were difficult to make.
6. The study was of an exploratory nature therefore the treatment of data was broad and superficial in a number of areas rather than intensive and detailed in any one area.
7. Several of the tests were adapted for use in an informal manner for purposes of this survey, therefore norms were not available for comparative purposes.

Conclusions drawn from this study must necessarily be considered in the light of the foregoing limitations.

IMPLICATIONS AND RECOMMENDATIONS FOR INSTRUCTION AND TESTING

1. The findings of this study have shown that many difficulties observed in the reading performances of retarded readers were of a specific rather than a general nature. These findings hold implications for teaching. If the particular items which were causing a deficiency were discovered for individuals or groups more precise and economical instruction could be carried out. Some examples of teaching practices which appeared to be useful in this regard were:
   (a) emphasis on the association of short vowel sounds with their symbols;
   (b) the teaching of prefixes, suffixes and syllables as units applied to specific words;
   (c) particular emphasis on the use of the letter 's' as a suffix.
2. The lack of ability to make generalizations of all types seemed to be a characteristic of these severely retarded readers. This would again indicate the need for more specific teaching of the exact words in which a structural or phonetic element was applied. An example of this need was observed in the many confusions with regard to the soft sounds of 'c' and 'g'. The rule was known but application was not correctly made in specific instances.

3. The results of both aptitude and associative learning tests indicated that these retarded readers could not depend on any single method of learning. This was especially apparent when the presentation was of a purely visual nature. This would imply the need for a diversity of presentation methods. This diversity of presentation needs to make full use of all perceptual powers in each learning situation. Concurrent with a visual presentation should be auditory and kinaesthetic reinforcement.
4. Test results for the group pointed to lack of ability to coordinate efforts in the various perceptual fields as a major indication of difficulty. The implication for teaching would seem to suggest that more careful presentation and training could be applied to the development of perceptual coordination. Attention to the teaching of a skill such as copying material from text or dictation would assist in strengthening the coordination of kinaesthetic-visual and kinaesthetic-auditory perception.
5. Some factors which may serve as predictors of reading ability were most clearly seen in the tests which involved associative learning and aptitude for reading. Types of responses observed for both individuals and the group were most consistent in these tests. The implication followed that certain specified items from tests of associative learning and aptitude should be used more extensively by teachers as well as reading specialists

for their predictive value. For early identification of children who may have difficulty with reading, readiness tests should be devised which include these types of items.

6. Several of the major areas of difficulty appeared to maintain a fairly constant ratio regardless of the grade level of the test material used. Since errors in such areas as the pronunciation of vowels were equally as prevalent in easy material as in more difficult selections further attention should be given to the grade placement of retarded readers.

SUGGESTIONS FOR FURTHER RESEARCH

The exploratory nature of this study has raised several questions and indicated other investigations which would add to the existing body of knowledge concerning reading retardation.

1. Though several investigations of recent date had attempted to define patterns of performance in retarded readers none of these had used a control group for purposes of determining whether similar patterns of behaviour were present in the performances of achieving readers. Further investigations of this possibility should be carried out.
2. The question was raised as to the impossibility of testing any one area of perception in its 'pure' form. Some form of kinaesthetic response is necessary for most test responses. Research is needed to determine the effect of kinaesthetic performance on both auditory and visual perception.

3. Results of tests used in this study were determined to a large degree by the method of presentation of the tests and the type of test material used. Further research is needed to determine the types of behaviour which might result if other test materials were used and different methods of presentation were made.
4. Recent clinical studies have indicated a possibility that many aspects of reading difficulty which were formerly recognized as causes may possibly be symptoms of a common cause. Further studies which deal with patterns of reading behaviour should be directed to the determination of symptoms versus causes of reading difficulty.
5. Few tests were available in the areas of aptitude and associative learning as they apply to reading performance. The development of more precise testing instruments in these fields is necessary.
6. The development of techniques to check specific items of perceptual behaviour in visual, auditory and kinaesthetic fields as well as total results for general areas is necessary. These techniques should be assessed in terms of their usefulness for diagnostic purposes.
7. Although memory, both immediate and long-term, is an important factor in the learning process most of the available studies which dealt with this aspect of the reading act, were concerned with memory as it applied to visual and auditory perception. Research which dealt with memory as it applied to kinaesthetic perception was sparse. More

studies are needed to investigate this field.

8. Although some recent research has been reported which dealt with test results as possible predictors of reading performance, the most important of these studies were those which involved the use of the Wechsler Intelligence Scale for Children. The administration and interpretation of this test requires specialized training which is unavailable to most classroom teachers. Because the early recognition of possible problems in learning to read is the first step in a preventative program, the teacher is in the best position to first recognize symptoms of difficulty. Research is needed to determine the kinds of tests which can be given and interpreted by teachers to enable them to make early diagnoses of children who may not learn to read without special methods of instruction.

CONCLUDING STATEMENT

Although this study attempted to prove the existence of patterns of perceptual performance which may predict difficulty in learning to read, the results proved only partially successful, for the following reasons:

a) It was discovered that the performances of individual students, rather than following a definite pattern, showed wide variations. Perhaps this divergence of scores was in itself a pattern. Although individual scores tended to fluctuate, group results, especially

in visual and kinaesthetic fields, showed evidences of a number of patterns of performance.

b) Performance in the areas of visual, auditory and kinaesthetic perception was difficult to measure. Most of the existing tests did not prove to be "pure" measures of any one perceptual field. Responses which tested performance in a specific area also required the use of perceptual skills from other areas.

However, there was sufficient evidence of patterns of performance for the group, especially in the tests of Aptitude and Associative Learning, to warrant the use of these tests as possible predictors of reading performance. The development of more precise instruments for testing in these areas,if designed for use by classroom teachers, will bring them closer to the goal of early identification of students who may have difficulty in learning to read.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

Betts, E. A. Prevention and Correction of Reading Difficulties. New York: Row Peterson Co., 1936.

Bond, G. L. The Auditory and Speech Characteristics of Poor Readers. New York: Bureau of Publications, Teachers' College, Columbia University, 1935.

Bond, Guy L. and Miles A. Tinker, Reading Difficulties Their Diagnosis and Correction. New York: Appleton Century-Crofts, Inc., 1957.

Durrell, Donald D. Improving Reading Instruction. Yonkers-on-Hudson, New York: World Book Co., 1940.

Fernald, Grace M. Remedial Techniques in the Basic School Subjects. New York: McGraw-Hill Book Company, Inc., 1943.

Gates, Arthur I. The Psychology of Reading and Spelling. New York: Teachers College, Columbia University, 1922.

_______________. The Improvement of Reading. New York: The Macmillan Company, 1937.

_______________. The Improvement of Reading, 3rd ed. New York: The Macmillan Company, 1947.

_______________ and David H. Russell. Diagnostic and Remedial Spelling Manual. New York: Bureau of Publications, Teachers College, Columbia University, 1940.

Goins, Jean Turner. Visual Perceptual Abilities and Early Reading Progress. (Supplementary Education Monographs, No. 87,) University of Chicago Press, 1958.

Harris, Albert J. How to Increase Reading Ability. New York and Toronto: Longmans, Green and Co., 1947.

Hildreth, Gertrude. The Teaching of Reading. New York: Henry Holt and Company, 1959.

Kottmeyer, William. Teachers' Guide for Remedial Reading. St. Louis, Missouri: Webster Publishing Company, 1959.

McKee, Paul. The Teaching of Reading. New York: Houghton Mifflin Co., 1948.

Monroe, Marion. Children Who Cannot Read. Chicago: University of Chicago Press, 1932.

Phelan, Sister Mary Benedict. Visual Perception in Relation to Variance in Reading and Spelling. (Educational Research Monographs, Vol. XII, No. 3,) The Catholic University of America, 1940.

Robinson, Helen M. Why Pupils Fail in Reading. Chicago: University of Chicago Press, 1946.

Smith, Henry P. and E. V. DeChant. Psychology of Teaching Reading. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1961.

Schonell, Fred J. Backwardness in the Basic Subjects. Edinburgh, Great Britain: Oliver and Boyd Ltd., 1942.

Schonell, Fred J. and F. Eleanor Schonell. Diagnostic and Attainment Testing. Edinburgh, Great Britain: Oliver and Boyd Ltd., 1950.

Schonell, Fred J. The Psychology and Teaching of Reading. Edinburgh, Great Britain: Oliver and Boyd Ltd., 1951.

Vernon, M. D. Backwardness in Reading. London: Cambridge University Press, 1957.

B. JOURNALS AND PUBLICATIONS

Betts, Emmett A. "Reading Problems at Intermediate School Levels," Elementary School Journal, XL, (June, 1940), 737-46.

de Hirsch, Katrina. "Tests Designed to Discover Potential Reading Difficulties at the Six-Year-Old Level," American Journal of Orthopsychiatry, XXVII, No. 3 (1957).

_________________. "Reading and Total Language Disability." In J. Allen Figurel (ed,), Changing Concepts of Reading Instruction, International Reading Association Conference Proceedings, VI, 1961. New York: Scholastic Magazines, 1961, 211-14.

Dockrell, W. B. "The Use of Wechsler Intelligence Scale for Children in the Diagnosis of Retarded Readers," Alberta Journal of Educational Research, Vol. 6, No. 2 (June, 1960) 86-91.

Johnson, Marjorie Seddon. "Factors Related to Disability in Reading," Journal of Experimental Education, Vol. 26, (September, 1957).

________________________. "A Study of Diagnostic and Remedial Procedures in a Reading Clinic Laboratory School," Journal of Educational Research, No. 48, (1955), 565-78.

Renshaw, Samuel. "The Visual Perception and Reproduction of Forms by Tachistoscope Methods," *Journal of Psychology*, XX (October, 1945), 217-32.

Robeck, Mildred. "Children Who Show Undue Tension When Reading." In J. Allen Figurel (ed,), *Challenge and Experiment in Reading*, International Reading Association Conference Proceedings, VII, 1962. New York: Scholastic Magazines, 1962, 133-38.

Robinson, H. Alan. "Trends in Identifying and Diagnosing Retarded Readers." In J. Allen Figurel (ed,), *Challenge and Experiment in Reading*, International Reading Association Conference Proceedings, VII, 1962. New York: Scholastic Magazines, 1962, 61-62.

Spache, George. "A Critical Analysis of Various Methods of Classifying Spelling Errors," Journal of Educational Psychology, XXXI (February, 1940) 111-34.

Stauffer, Russell G. "Certain Psychological Manifestations of Retarded Readers," (Ph.D. dissertation, Temple University, 1947,) *Journal of Educational Research*, XLI, (February, 1948) 436-52.

Stroud, J. B. "Rate of Visual Perception as a Factor in Rate of Reading," *Journal of Educational Psychology*, XXXVI, (November, 1945), 495-96.

Van Alstyne, Dorothy. "A Study of Ten Gifted Children Whose School Progress Was Unsatisfactory," *Journal of Educational Research*, No. 8, (September, 1923), 123-35.

Visitation, Sister Mary of the. "Visual Perception in Reading and Spelling: A Statistical Analysis," *Catholic Universities of America, Educational Research Bulletin*, Vol. IV, No. 1, (Washington: Catholic Education Press, 1929).

Wepman, Joseph M. "Auditory Discrimination, Speech, and Reading," *Elementary School Journal*, LX (March, 1960) 325-33.

C. UNPUBLISHED THESES

Glennon, Mary Bernadette. "An Investigation of the Relationships Between Two Speeded Tests of Visual Motor Skills and a Measure of Reading Achievement." Unpublished Master's thesis, Department of Education, University of Alberta, 1961.

Reed, Ruth Lillian. "Auditory Aspects of Reading Readiness." Unpublished Master's thesis, Department of Education, University of Alberta, 1962.

D. TESTS

Gates, Arthur I. *Tests of Associative Learning*, Betts Reading Clinic, Haverford, Pennsylvania, 1935.

Monroe, Marion and E. E. Sherman. *Group Diagnostic Reading and Achievement, Intermediate Form*, C. H. Nevins Printing Co., Pittsburgh, Pennsylvania.

Neale, M. D. *Neale Analysis of Reading Ability, Forms A and B*, Macmillan and Co. Ltd., London, 1958.

Schonell, Fred J. and F. Eleanor Schonell. *SI - Graded Word Spelling Test A*, Oliver and Boyd, Ltd., Edinburgh, 1940.

______________________________. *Graded Reading Vocabulary Test*, Oliver and Boyd, Ltd., Edinburgh, 1940.

APPENDICES

BETT'S READING VOCABULARY

e____________________ Age____________ Date____________________

-----------Pre-Primer Level---------------

mulus	Flash	Untimed
The		
a		
mother		
is		
I		
to		
and		
said		
come		
you		
in		
will		
father		
little		
here		

------------------Primer level------------------

Stimulus	Flash	Untimed
1. with		
2. me		
3. for		
4. he		
5. we		
6. my		
7. away		
8. can		
9. like		
10. are		
11. did		
12. no		
13. red		
14. they		
15. at		
16. no		
17. one		
18. some		
19. girl		
20. do		

st Reader Level

mulus	Response Flash	Untimed
old		
told		
water		
way		
many		
again		
know		
over		
other		
next		
please		
off		
night		
be		
time		
work		
thing		
when		
their		
would		

Second Reader Level.

Stimulus	Flash	Response Untimed
1. dress		
2. noise		
3. bark		
4. string		
5. through		
6. side		
7. knew		
8. cook		
9. air		
10. tire		
11. across		
12. floor		
13. wash		
14. while		
15. ever		
16. tie		
17. anything		
18. hard		
19. beauty		
20. bowl		

rd Reader Level.

	Response	
mulus	flash	Untimed
heard		
beautiful		
clothe		
kept		
hot		
really		
hundred		
careful		
also		
wonderful		
different		
wooden		
lovely		
path		
whole		
led		
above		
wore		
indeed		
journey		
fasten		
empty		
stove		
float		
invite		

College Reading Service
Temple University

Word Recognition Skills Inventory
Form 1

Name ______________________________ Date ____________________

This list was sampled from the Durrell-Sullivan Reading Vocabularies for grades four, five, and six derived from word counts of books commonly used in each grade.
The list was prepared by T. J. Edwards.

IV

Stimulus	Flash	Untimed
1. ablaze		
2. bacon		
3. breathe		
4. chief		
5. crew		
6. distress		
7. exact		
8. forge		
9. gown		
10. hobo		
11. introduce		
12. lame		
13. manner		
14. mount		
15. pedal		
16. racket		
17. ruin		
18. shanty		
19. teeming		
20. unequal		

V.

Stimulus	Flash	Untimed
1. accomplish		
2. barrel		
3. butternut		
4. committee		
5. cylinder		
6. doily		
7. exclaim		
8. furrow		
9. gurgle		
10. injure		
11. lime		
12. molasses		
13. oath		
14. physical		
15. provoke		
16. roost		
17. snuggle		
18. terror		
19. twine		
20. waft		

VI.

Stimulus	Flash	Untimed
1. abandon		
2. bandanna		
3. casual		
4. cooperation		
5. divert		
6. extensive		
7. girder		
8. herring		
9. irate		
10. lattice		
11. memorial		
12. novel		
13. partial		
14. portable		
15. recipe		
16. scribe		
17. spoil		
18. tango		
19. unwise		
20. wallop		

tree	little	milk	egg	book
school	sit	frog	playing	bun
flower	road	clock	train	light
picture	think	summer	people	something
dream	downstairs	biscuit	shepherd	thirsty
crowd	sandwich	beginning	postage	island
saucer	angel	ceiling	appeared	gnome
canary	attractive	imagine	nephew	gradually
smoulder	applaud	disposal	nourished	diseased
university	orchestra	knowledge	audience	situated
physics	campaign	choir	intercede	fascinate
forfeit	siege	recent	plausible	prophecy
colonel	soloist	systematic	slovenly	classification
genuine	institution	pivot	conscience	heroic
pneumonia	preliminary	antique	susceptible	enigma
oblivion	scintillate	satirical	sabre	beguile
terrestrial	belligerent	adamant	sepulchre	statistics
miscellaneous	procrastinate	tyrannical	evangelical	grotesque
ineradicable	judicature	preferential	homonym	fictitious
rescind	metamorphosis	somnambulist	bibliography	idiosyncrasy

Schonell's Graded Word Reading Test

NAME ______________________ SCORE ______________

SCHOOL ______________________ READING AGE ______________

DATE OF TEST ______________ AGE ______ MENTAL AGE ______________
(if known)

DATE OF BIRTH ______________________ EXAMINER'S INITIALS ________

INSTRUCTIONS FOR ADMINISTERING THE TEST:

The words are dictated by the examiner and written on paper by the pupils. To aid the pupils in knowing the word to be written each word is first dictated, next used in an explanatory sentence and then dictated again.

WRITING OF TEST BY PUPILS:

Pupils should write the words in groups of five across the page of paper, i.e. along the lines, not down. Thus on each line there should be only five words. This form of setting out aids in marking and in the calculation of spelling age. Pupils should continue writing words until they fail with 8 to 10 consecutive words.

SCORING:

The results on the test can be scored in the form of a spelling age from the following formula:

$$\text{Spelling Age} = \frac{\text{Number of words correctly spelled}}{10} + 5 \text{ years},$$

thus 39 words right = S.A. of $\frac{39}{10} + 5 = 8.9$ years.

S. I. GRADED WORD SPELLING TEST A

net	can	fun	top	rag
sat	hit	lid	cap	had
let	doll	bell	yes	then
may	tree	by	ill	egg
land	how	your	cold	talk
flower	son	seem	four	loud
ground	lowest	brain	write	amount
noise	remain	hoped	worry	dancing
damage	else	through	entered	cough
fitted	spare	daughter	edge	search
concert	domestic	topic	method	freeze
avoid	duties	recent	type	instance
liquid	assist	readily	guess	attendance
description	welfare	various	genuine	interfere
accordance	mechanical	anxious	signature	allotment
approval	accomplished	remittance	financial	capacity
surplus	exceptionally	successful	preliminary	resource
prologue	colonel	coarse	referring	courteous
exhibition	affectionately	attorney	pinnacle	toboggan
definite	guarantee	anniversary	irresistible	hydraulic

NEALE
ANALYSIS OF READING ABILITY

By M. D. NEALE, M.A., Ph.D.

INDIVIDUAL RECORD SHEET — FORM A

Name

School

Sex

Age

Date of Birth

I.Q.

Family M F

Examiner

Date

INITIAL INTERVIEW

Appearance

Hearing

Eyesight

Interests

Pertinent Emotional Difficulties

Attitude to Reading. Likes "a little" "a lot" "not really"

Attitude to School. Likes "a little" "a lot" "not really"

QUALITATIVE ASSESSMENT

PERSONAL CHARACTERISTICS

Needs encouragement to begin reading

Refuses to try unknown words

Repeats words or phrases habitually

Reads in a quiet loud

mumbled hurried voice

WORD RECOGNITION

Guesses at unknown words

Reverses words

Uses contextual clues

Spells out words

Sounds out letter combinations but cannot synthesize

Does not know letters

Does not know sounds

GENERAL READING HABITS

Reads word by word

Ignores punctuation

Enunciation. Poor Average Good

Holds reading close to face

Uses finger as pointer

Loses place frequently

Head movements. Marked Slight

TEST SUMMARY

Passage	Words read	Time in secs.	Errors	Accuracy score	Comprehension
1	26		=		
2	75		=		
3	149		=		
4	240		=		
5	358		=		
6	497		=		
Totals		*			

Reading Ages

* Words per min. $= \frac{\text{Words}}{\text{Time}} \times \frac{60}{1} = \frac{\quad}{\quad} \times \frac{60}{1}$

Choice of Story

Comments or Recommendations

1 KITTEN (26)	Mis*	Sub	Ref	Add	Oms	Rev
A						
black						
cat						
came						
to						
my						
house.						
She						
put						
her						
kitten						
by						
the						
door.						
Then						

1 continued	Mis	Sub	Ref	Add	Oms	Rev
she						
went						
away.						
Now						
I						
have						
her						
baby						
for						
a						
pet						

Errors

Time

Comprehension

Questions

1. What came to the little boy's/girl's house?
2. Where did the black cat leave her kitten?
3. What did the black cat do then?
4. What did the little boy/girl do with the kitten?

2 TOM (49)	Mis	Sub	Ref	Add	Oms	Rev
Tom						
stopped						
on						
his way						
to school.						
The milkman's						
horse had						
wandered						
in the fog.						
The horse						
and cart						
blocked						
the centre						
of the road.						
Traffic						
was coming.						
There was						

2 continued	Mis	Sub	Ref	Add	Oms	Rev
no						
time						
to call						
the milkman.						
Quickly						
Tom						
led						
the horse						
to safety						
just as the						
frightened						
milkman						
returned.						

Errors

Time

Comprehension

Questions

1. Where was Tom going?
2. What did he see on the way?
3. What had happened to the horse?
4. What kind of day was it?
   Or What was the weather like?
5. Why was it dangerous for the horse and cart to stay there?
6. Why didn't Tom call the milkman?
7. What did Tom do?
8. How did the milkman feel as he came running back?

3 CIRCUS (74)	Mis	Sub	Ref	Add	Oms	Rev
The lions'						
final						
act was						
in progress.						
Jack stood						
waiting to						
clear the ring.						
Tonight the						
thunder						
outside the						
circus tent						
had made the						
lions restless.						
Suddenly Tess,						
the lion trainer,						
stumbled.						
Her whip fell.						
The youngest						
lion sprang						
towards her.						
Swiftly						

3 continued	Mis	Sub	Ref	Add	Oms	Rev
Jack leaped						
inside the cage,						
cracking the						
whip with						
great skill.						
His prompt						
action						
enabled						
Tess to regain						
control quickly.						
During						
that brief						
adventure,						
however, Jack						
had decided						
upon his						
future work.						

Errors

Time

Comprehension

Questions

1. Where did this story take place?
   Or Where was all this happening?
2. Were the lions near the beginning, near the middle or near the end of their act?
3. What was Jack waiting to do?
4. Why were the lions restless?
5. What happened to Tess?
6. What did Jack do?
7. Who finished the act?
8. What did Jack decide after this adventure?

---

* *Mispronunciations, Substitutions, Refusals, Additions, Omissions, Reversals*

4 DRAGON (91)	Mis	Sub	Ref	Add	Oms	Rev
The fearful						
roaring of the						
dragon guided						
the Knight to						
the monster's						
territory. As the						
intruder crossed						
the dreaded						
marshes, the						
dragon charged						
furiously,						
whipping its						
enormous tail						
around the legs						
of the Knight's						
steed. Horse and						
rider collapsed.						
The Knight now						
realised that he						
must attack when						
the creature						
was off-guard.						

4 continued	Mis	Sub	Ref	Add	Oms	Rev
He crouched						
as though						
wounded.						
The monster,						
accustomed to						
speedy victory,						
prepared to seize						
its prey. Then						
the Knight struck						
powerfully						
beneath the						
beast's out-						
stretched wing.						
A despairing						
groan told the						
villagers that						
they would be						
troubled no more.						

Errors

Time

Comprehension

Questions

1. How did the Knight know exactly where to find the dragon?
   Or What guided the Knight to the dragon?
2. What kind of land did the Knight have to cross over?
3. How did the dragon knock the Knight down?
4. What did the Knight realise would be a good moment to attack the dragon?
5. What did the Knight pretend?
6. Why did the dragon think that its very first blow could kill the Knight?
7. What part of the dragon's body did the Knight strike?
8. Why would the villagers be pleased at the defeat of the dragon?

5 SUBMARINE (118)	Mis	Sub	Ref	Add	Oms	Rev
The stricken						
submarine						
lay at a depth						
of approximately						
one hundred and						
twenty feet.						
Although it was						
common						
knowledge that						
the treacherous						
currents of the						
area would						
make rescue						
operations						
difficult, the						
crew remained						
disciplined and						
confident. Mean-						
while, outside						
their prison,						
a diver with						
technical						
equipment for						
their release						
was in peril.						
His life-line						
had become						
entangled						
around a						
projection on						
an adjacent						

5 continued	Mis	Sub	Ref	Add	Oms	Rev
wreckage.						
Experience						
warned him						
against his						
first impulse						
to dislodge the						
line by force.						
Patiently						
he turned						
and twisted.						
At last his						
calmness and						
persistence						
were rewarded.						
Triumphantly he						
detached the						
final loop from						
the obstruction.						
Then fatigued						
but undaunted by						
this unpleasant						
accident,						
he proceeded						
to provide an						
escape exit for						
the submarine's						
captives.						

Errors

Time

Comprehension

Questions

1. What did the diver have to do in this story?
2. To what depth did he have to go?
3. What made rescue work difficult in this area?
   Or What was this part of the sea noted for?
4. How did the crew feel? Add Were they hopeful or had they given up hope?
5. What happened to the diver?
6. What did the diver's experience warn him not to do?
7. How did the diver behave in his danger?
   Or What qualities did the diver show in his danger?
8. What did the diver do as soon as he was free?

6 EVEREST (139)	Mis	Sub	Ref	Add	Oms	Rev
Realising the						
necessity for						
conserving						
the strength of						
the team, the						
leader decided						
to pitch an						
intermediate						
camp. The						
initial						
enthusiasm and						
anticipation						
of attaining						
the final camp						
had been						
subdued						
by the recent						
mishap						
in which one						
member had						
fallen into a						
crevasse.						
Although the						
rescue had been						
accomplished						
magnificently,						
it was obvious						
that the						
incident						
had hampered						
the original						
programme. The						
men accepted						
the leader's						
decision						
with relief.						
The tedious						

6 continued	Mis	Sub	Ref	Add	Oms	Rev
crawl to the						
plateau against						
incessant winds						
of varying						
violence had						
challenged						
their endurance						
to the limit.						
Every step at						
this height						
required						
will-power.						
Immediately						
ahead lay an						
unforeseen rise						
from which,						
by great						
misfortune, all						
the tracks of the						
advance party						
had disappeared.						
Rest was						
essential if						
the men were to						
withstand the						
arduous						
conditions in						
the concluding						
stages of the						
assault						
upon this						
unconquered						
peak.						

Errors ....

Time ....

Comprehension ....

Questions

1. What did the leader realise his men needed?
2. What did the leader decide to do?
3. How did the men feel about the leader's decision to stop climbing? Were they pleased or annoyed?
4. What incident had hindered their progress?
5. What had made them slacken their pace of climbing to a crawl? Or What made them go so very slowly?
6. What lay just ahead of them?
7. What piece of bad luck had the team noticed?
8. Why would it be very exciting to reach the peak?

SUPPLEMENTARY DIAGNOSTIC TEST 1. What are the names and sounds of these letters ?

a c o e u i m r n s z v x w
d f h l t b k p y p g j

SUPPLEMENTARY DIAGNOSTIC TEST 2. Auditory discrimination through simple spelling.

tap
but
big
gate
man
red
show
chicken
rat
pet
star
sport

SUPPLEMENTARY DIAGNOSTIC TEST 3. Blending and recognition of syllables.

1. c- old d- ear l- ock t- ask
2. m- ouse l- augh s- ight b- urnt
3. ch- ill br- ake th- ief gr- owl
4. pic- nic thr- oat fly- ing str- ong

This leaflet is copyright in all countries which are signatories to the Berne Convention

LONDON
MACMILLAN & CO LTD
NEW YORK - ST MARTIN'S PRESS

Printed in Great Britain

R.20M.8.60

NEALE
ANALYSIS OF READING ABILITY

By M. D. NEALE, M.A., Ph.D.

INDIVIDUAL RECORD SHEET — FORM B

Name

School

Sex

Age

Date of Birth

I.Q.

Family M F

Examiner

Date

INITIAL INTERVIEW

Appearance

Hearing

Eyesight

Interests

Pertinent Emotional Difficulties

Attitude to Reading. Likes "a little" "a lot" "not really"

Attitude to School. Likes "a little" "a lot" "not really"

QUALITATIVE ASSESSMENT

PERSONAL CHARACTERISTICS

Needs encouragement to begin reading

Refuses to try unknown words

Repeats words or phrases habitually

Reads in a quiet loud mumbled hurried voice

WORD RECOGNITION

Guesses at unknown words

Reverses words

Uses contextual clues

Spells out words

Sounds out letter combinations but cannot synthesize

Does not know letters

Does not know sounds

GENERAL READING HABITS

Reads word by word

Ignores punctuation

Enunciation. Poor Average Good

Holds reading close to face

Uses finger as pointer

Loses place frequently

Head movements. Marked Slight

TEST SUMMARY

Passage	Words read	Time in secs.	Errors		Accuracy score	Comprehension
1	26			=		
2	75			=		
3	149			=		
4	240			=		
5	358			=		
6	497			=		
Totals		*				

Reading Ages

$$* \text{ Words per min.} = \frac{\text{Words}}{\text{Time}} \times \frac{60}{1} = - \times \frac{60}{1}$$

Choice of Story

Comments or Recommendations

1 PAM'S BOX (26)	Mis	Sub	Ref	Add	Oms	Rev
Father						
gave						
Pam						
a						
big						
box.						
Pam						
put						
it						
on						
the						
table.						
She						
looked						
in						

1 continued	Mis	Sub	Ref	Add	Oms	Rev
the						
box						
for						
a						
doll.						
Then						
out						
jumped						
a						
white						
rabbit.						

Errors

Time

Comprehension

Questions
1. Who gave Pam the box?
2. Where did Pam put the box?
3. What did she think would be in the box?
4. What was the surprise?

2 WOODMAN (49)	Mis	Sub	Ref	Add	Oms	Rev
John						
and Ann						
were fishing.						
Suddenly						
they						
heard						
a splash.						
A woodman						
had fallen						
into the						
lake.						
He could						
not swim,						
for he was						
hurt. The						
children						
tried						

2 continued	Mis	Sub	Ref	Add	Oms	Rev
to pull						
him ashore.						
He was						
too heavy.						
Then John						
held the						
man's						
head						
above						
water						
and Ann						
ran for						
help.						

Errors

Time

Comprehension

Questions
1. What were John and Ann doing at the lake?
2. What noise did they hear?
3. What had happened?
4. Why could the man not swim ashore?
5. What did the children try to do?
6. Why were they unable to pull him ashore?
7. How did John help the man?
6. How did Ann help?

3 PUPPET (72)	Mis	Sub	Ref	Add	Oms	Rev
The Swiss						
puppet						
watched						
the children						
arranging						
the puppet						
theatre. He						
felt useless.						
He was not						
often						
chosen						
to act						
because he wore						
unusual						
clothes. Now the						
children were						
discussing their						
new play. "We						
need a brave						
person for						
the mountain						

3 continued	Mis	Sub	Ref	Add	Oms	Rev
rescue,"						
explained						
a boy. Each						
puppet tried						
to appear like						
the required						
hero.						
Then cheers						
greeted						
the boy's						
choice. On						
to the stage						
was raised						
the shy						
but happy						
Swiss						
puppet.						

Errors

Time

Comprehension

Questions
1. What was the Swiss puppet watching in the beginning of the story?
2. Why did he feel useless?
3. Why was the Swiss puppet not chosen very often for the plays?
4. What kind of hero did the boy want for the new play?
5. What kind of work would the hero have to do in the play?
6. What did all the puppets hope?
7. How do you know that everyone was pleased with the hero that was chosen?
8. How did the Swiss puppet feel when he was chosen?

---

* *Mispronunciations, Substitutions, Refusals, Additions, Omissions, Reversals*

4 EXPLORING (91)	Mis	Sub	Ref	Add	Oms	Rev
It was midnight.						
A mournful						
wailing.						
echoed through						
the deserted						
castle. The						
girls ceased						
exploring						
abruptly.						
"Ghosts!"						
whispered one						
girl. "Nonsense!"						
replied the other,						
but nevertheless						
she proceeded						
cautiously in						
the direction of						
the mysterious						
noise. Gathering						
courage, and						
with mounting						
curiosity, the						
girls approached						
the old kitchen.						
Then scarcely						
daring to breathe,						
they swung open						
the door. Their						
torches searched						
the darkness and						
immediately their						
excitement turned						
to pity. Before						
them, almost						
exhausted, lay						
the farmer's dog.						
He had been						
imprisoned while						
hunting for rats						
by a gust of wind.						

Errors ....

Time ....

Comprehension ....

Questions

1. At what time did the girls go to the castle?
2. What were the girls doing at the castle?
3. What made them stop exploring?
4. Why did they go cautiously in the direction of the noise?
5. From where was the noise coming?
6. What did they discover?
7. What had the dog been doing there?
8. Why did the girls feel sorry for him?

5 ARABS (118)	Mis	Sub	Ref	Add	Oms	Rev
After a brief						
encounter						
with the Turks,						
Lawrence and						
his Arab force						
made a mock						
retreat. Although						
out-numbered,						
Lawrence						
guessed that						
surprise tactics						
might retrieve						
the campaign.						
Accordingly, as						
his followers						
withdrew,						
they concealed						
themselves in						
the rocky						
crevices						
of a narrow						
gorge						
leading to the						
city. Meanwhile						
the women,						
acquainted with						
the circumstances,						
prepared to						
defend the city						
gates. The						
success of						
Lawrence's						
plan depended						
on whether						
the Turks						
would assume						
that the Arab						
retreat						
was genuine.						
There was an						
interval						
of terrible						
tension. Then						
the unsuspecting						
Turks stormed						
in hot pursuit						
into the pass.						
At once,						
concentrated						
rifle fire swept						
their column.						
The troops						
fell into a						
panic, for						
the confined						
space permitted						
no counter						
attack.						

Errors ....

Time ....

Comprehension ....

Questions

1. Which two armies were taking part in this battle?
2. Which army was Lawrence leading?
3. Which side had the greater numbers?
4. What did Lawrence tell his men to do?
5. What did Lawrence hope that the Turks would think?
6. What part were the women taking in the battle?
7. Why did the Turks pursue the Arab force into the pass?
8. Why were the Turks unable to fight back successfully?

6 VOLCANO (139)	Mis	Sub	Ref	Add	Oms	Rev
Fascinated by						
the prospect						
of recording						
the spectacle of						
a long-dormant						
volcano						
smouldering						
again, the two						
scientists						
approached the						
crater's edge.						
Intent on their						
photography,						
they ignored						
an ominous						
rumbling. In						
reproof, the						
subterranean						
cauldron						
suddenly exploded						
violently,						
ejecting a						
great quantity						
of rocks.						
Fortunately						
these fell on						
to the opposite						
slopes. Greatly						
alarmed by this						
premature						
eruption, the						
men hastily						
began the descent.						
Instantly a						
gigantic						
avalanche						
of fiery						

6 continued	Mis	Sub	Ref	Add	Oms	Rev
boulders						
hurtled						
around them.						
Aware that						
their apparatus						
hindered						
progress, they						
abandoned all						
equipment						
except their						
precious						
cameras. Then						
came an anxious						
moment. As one						
man was evading						
a flying fragment,						
he was struck						
off-balance						
by a rebounding						
boulder. A						
lengthy halt						
would have been						
disastrous. It						
was, therefore,						
with immense						
relief that						
they discovered						
his injuries to						
be superficial						
and resumed						
the fantastic						
scramble to the						
safety zone.						

Errors ……………………

Time ……………………

Comprehension ……………………

Questions

1. What were the scientists doing on the volcano?
2. Why was this volcano so interesting?
3. What warning should the men have noted?
4. Whereabouts were the men when the volcano exploded?
5. How did they escape from the first explosion?
6. What did they do to speed up their descent?
7. What kind of material was ejected by the volcano?
8. Were the man's injuries serious or slight?

SUPPLEMENTARY DIAGNOSTIC TEST 1. What are the names and sounds of these letters ?

a c o e u i m r n s z v x w
d f h l t b k p y p g j

SUPPLEMENTARY DIAGNOSTIC TEST 2. Auditory discrimination through simple spelling.

tap
but
big
gate
man
red
show
chicken
rat
pet
star
sport

SUPPLEMENTARY DIAGNOSTIC TEST 3. Blending and recognition of syllables.

1. c- old d- ear l- ock t- ask
2. m- ouse l- augh s- ight b- urnt
3. ch- ill br- ake th- ief gr- owl
4. pic- nic thr- oat fly- ing str- ong

This leaflet is copyright in all countries which are signatories to the Berne Convention

LONDON
MACMILLAN & CO LTD
NEW YORK · ST MARTIN'S PRESS

Printed in Great Britain

R.20M.2.61

	Test XIV, A-1: Visual-Visual					Test XIV, A-2: Visual-Visual						Test XIV, B-1: Auditory-Visual					Test XIV, B-2: Auditory-Visual					
	1	2	3	4	T	1	2	3	4	5	T	1	2	3	4	T	1	2	3	4	5	T
:																						
:																						

GATES ASSOCIATIVE LEARNING TESTS

Pupil Record Form

INTERMEDIATE FORM
(GRADES 3 to 9)

Group Diagnostic Reading Aptitude and Achievement Tests

By MARION MONROE
Specialist in Remedial Instruction, Public Schools, Pittsburgh, Pa.

and EVA EDITH SHERMAN
Director of Testing and Evaluation, Public Schools, Santa Barbara, Calif.

Name .... Date .... Grade ....

School .... Birthdate .... Age ....

Intelligence Tests:

Name of test........................ Date given.................. C. A.......... M. A.......... I. Q..........

Name of test........................ Date given.................. C. A.......... M. A.......... I. Q..........

EDUCATIONAL PROFILE

GRADE	C. A.	M. A.	ARITH.	SPELL.	READING 1	READING 2	READING 3	AV.
10	15	15						
9	14	14						
8	13	13						
7	12	12						
6	11	11						
5	10	10						
4	9	9						
3	8	8						
2	7	7						
1	6	6						

DIAGNOSTIC PROFILES

Word Discrimination

% ile	Vowel	Cons.	Rev.	Add. Om.
90				
80				
70	- - -	- - -	- - -	- - -
60				
50				
40				
30				
20	- - -	- - -	- - -	- - -
10				
0				

Aptitude

	% ile	Vis. 1 2	Aud. 1 2	Mot. 1 2	Lang. 1
SUPERIOR	90				
	80				
AVERAGE	70				
	60				
	50				
	40				
	30				
INFERIOR	20				
	10				
	0				

INTELLIGENCE DATA Years Months

C. A. at date of reading test ....

M. A. (corrected to date of reading test, as follows:)

1. Change present C. A. to months
2. Multiply by last I. Q.
3. Omit last two figures of this product.
4. Divide by 12 to get years. Remainder is months. ....

EDUCATIONAL DATA

Reading tests Grade

1. Paragraph Meaning. ....
2. Speed of Reading. ....
3. Word Discrimination. ....

Average ....

Arithmetic test ....

Spelling test ....

WORD DISCRIMINATION DATA
Percentile for Grade

Types
1. Vowels ....
2. Consonants ....
3. Reversals ....
4. Additions and Omissions ....

APTITUDE DATA
Percentile for Age

Visual
1. Letter Memory ....
2. Form Memory ....

Auditory
1. Letter Memory ....
2. Orientation and Discrimination ....

Motor
1. Copying Text ....
2. Cross-out Letters ....

Language
1. Vocabulary ....

Copyright 1939 C. H. Nevins Printing Co.

Use this page for recording additional data, such as the child's school adjustment, problems in behavior, physical, or other defects, home conditions, etc.

Part 1. Achievement Tests

READING TEST 1. PARAGRAPH UNDERSTANDING

Directions: Read the question. Then read the paragraph and find the answer to the question. At the end of the paragraph, draw a line under the word which answers the question. When you finish this page, go on to the next.

Sample: **What does Tom's dog do?**

Tom has a dog.
The dog runs.

has runs Tom dog

Sample: **Who has a cat?**

Mary has two pets.
They are a cat and a dog.

pets cat dog Mary

Allow 7 minutes

---

1. **What does Peter have?**

Peter is a boy.
He has a ball.

boy ball doll Peter

2. **Who is here with the car?**

Mother said, "Come, Jane.
Father is here with the car."

Jane car Mother Father

3. **Who likes the cat?**

Baby has a cat.
She does not like the cat.
Brother likes it.

Baby cat likes Brother

4. **What did the boy lose?**

A boy was looking for something he lost.
A man said, "I will help you find it."
They found the penny in the grass.

grass nickel penny man

5. **Who was the child?**

Molly saw a child.
She said, "What is your name?"
The child said, "My name is Betty."

Molly name Betty child

6. **What doll did the little girl like most?**

A little girl had two dolls.
She got one this year and one last year.
She said, "I like my new doll, but I like the old doll best."

two dolls old doll new doll little girl

7. **What did the farmer feed the cows?**

A farmer had cows, horses, chickens and ducks. He fed the cows and horses hay. To the chickens and ducks he fed corn.

horses corn hay ducks

8. **How old is Bill?**

Mary is ten years old. She has little twin brothers named Tom and Bill, and a brother Jack who is twelve years old. Tom is six.

ten twelve six eight

9. **What did Father want the children to do?**

Father said, "Hurry, children. We shall be late for the train. We are going to see Grandma and Grandpa."

see Grandma to see to hurry to be late

10. **Where does Bob help his father?**

Bob goes to school every day except Saturday and Sunday. On Saturday he helps his father at the store. On Sunday he and his father go to church.

church Saturday store father every day

11. **What kind of kitten did Mrs. Brown find?**

Mrs. Brown found a kitten in the barnyard one winter day. The kitten was so weak it could hardly stand. Mrs. Brown took it into the warm house and put it into a little basket.

weak little warm barnyard house

Go on to next page.

12. **Where did John go last?**

John said, "I did two things today. I went to the bank after I took my book back to the library."

bank library school today John

13. **When is Alice's next music lesson?**

Alice is becoming a fine musician. She practices on the piano every day. On Tuesday and Friday she takes her music lesson. Today is Wednesday.

Monday Tuesday Wednesday Thursday Friday

14. **Of what are toy animals made in Mexico?**

In Mexican markets many things are on display. The tourist can buy brightly colored blankets of wool or cotton; leather shoes or purses; clay pigs, cats, or rabbits; and interesting carved human figures made of wood. Many of the toy animals are painted in bright colors with funny dots and stripes.

colors wood leather clay dots and stripes

15. **When did the children go for a walk?**

On Tuesday it rained, so the children played indoors. Wednesday morning it was still too muddy to play outside, but their father took them for a ride in the park. Yesterday was bright and clear, and they went for a walk in the forest. They met an old woman when they had gone about a mile.

yesterday in the park Tuesday morning in the forest about a mile

16. **Which rug is most expensive?**

The merchant said, "The dye used in this red rug comes from a very tiny animal. Thousands of animals are necessary to make even a small amount of dye. For that reason the rug is worth much more than the blue or green rugs."

animals blue red green tiny merchant

17. **Which game do I prefer?**

Second only to tennis, in my opinion, is the game of golf. Both games require more skill of hand and quickness of movement and eye than card games or checkers.

tennis golf card games checkers games

18. **How did I feel?**

The angry rhinocerous came so close that I could hear the huge beast snort. I reached for my automatic rifle, although I well knew that my bullets would have little effect on his tough hide. Terrified, I watched him advance toward me.

angry huge well little terrified

19. **Whom did Washington praise?**

During the hardships of the Revolutionary war, everyone—young and old, soldiers, farmers, and artisans—all worked arduously for their country. Washington frequently commended especially the patriotism and devotion of the women. They worked as tirelessly as the soldiers on the battlefields, but with other implements than firearms.

soldiers women farmers artisans patriotism

20. **What means of transportation seemed peculiar to Mr. Jones?**

For thirty years Mr. Jones lived in a country where the dog-team was the sole means of transportation. Accustomed as he was to the sled or travois, he found it difficult, on his return to civilization, to refrain from gaping wide-eyed in wonder at the automobiles of our modern city streets.

dog-team sled automobiles street travois

21. **What is the most economical type of locomotive?**

Engineers strive to reduce the weight of engines and thereby lessen the pounding of the driving wheels against the iron rails at high speeds. Less pounding means longer wear, both for locomotives and tracks The new stream-line trains are usually made from aluminum and are both lighter and easier to pull than the old type steel locomotives.

steel aluminum iron wood old-type

Go on to next page.

22. **Who may submit entries in the contest?**

The committee of judges will give careful attention to every entry submitted. The entrants should type the manuscripts on only one side of the paper. Any magazine reader is eligible to compete. The contest is closed to relatives of the judges, or employees of the firm.

committee members **employees**
judges **judges' relatives**
magazine readers

23. **Future buyers of airplanes may expect a reduction in what?**

Airplanes are rapidly being improved to increase speed and safety. In fact, each new plane built is out of date soon after delivery to the purchaser. Eventually, when the experimental stage in aviation has been passed, airplanes will be standardized and produced at a considerably lower price than at present.

delivery **speed** **safety** **price**
aviation **airplanes**

24. **What do vocational tests measure?**

Tests for vocational guidance are effective tools in helping high school students select suitable occupations. The counsellor explains to the student that the tests cannot dictate his future vocation in absolute terms, but rather point out his aptitudes and abilities. He may then make a more intelligent and successful occupational choice than would be possible otherwise.

occupations **absolute terms**
aptitudes **counsellor** **guidance**

25. **What kind of abstracts appear in "Biological Abstracts"?**

"Biological Abstracts" is a scientific journal consisting of extremely condensed summaries or abstracts of current scientific, biological literature. Biology, however is such an extensive field that the abstracts, if published in one volume, would be expensive and bulky. They are, therefore, divided into five volumes dealing with specialized topics within the general biological field, each of which may be purchased independently.

extensive **widespread** **expensive**
condensed **bulky** **volume**

26. **What should citizens do in reading news items?**

A newspaper becomes an organ of propoganda when subversive influences are allowed to invade the field of reporting events. Citizens should be trained to evaluate each news item in terms of its authenticity, and to expend unmitigated efforts in denouncing newspapers which flagrantly violate veracity in efforts to influence political conduct.

evaluate **denounce** **violate**
invade **influence** **veracity**

27. **What partially overcomes the limits of human perception?**

There are limits of exactness in human perception which are irremedial. As two lines or forms are made more nearly equal, a point is reached at which the unaided eye can no longer distinguish between them. To eliminate this source of error in observation, precision instruments have been devised which permit greater accuracy of measurement than could be obtained otherwise.

observation **instruments** **exactness**
accuracy **irremedial** **forms**

28. **What makes diagnosis of fatigue difficult?**

Depression, inattention, and erratic behavior may result from fatigue. In any consideration of fatigue, the capacity of the human being to compensate temporarily by special effort should be remembered. This capacity not infrequently produces remarkable results and may be correspondingly misleading. Interpretation of fatigue is impossible, even when aggravated, unless this capacity is controlled or eliminated.

compensation **capacity** **results**
fatigue **aggravated** **eliminated**
depression

Stop here.

Score______________
(Number right)

Score	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Over 26
Grade	1.0	1.3	1.5	1.7	2.0	2.3	2.8	3.2	3.5	3.8	4.2	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.3	8.6	9.0	9.3	9.7	10.0	10.5	11.0	11 0+

READING TEST 2. SPEED

Directions: This is a test to find out how fast you can read. You will find things to do in almost every sentence. Be sure to do each thing right, but go as fast as you can.

Allow 1½ minutes

Put a ring around the flag. Put a 1
line under the tree. Make a cross on 2
this line........Write the number three after 3
this sentence........Read as fast as you can. 4
Write "yes" on this line................ 5

If you have two eyes, write 2 after this
sentence..............If you can see, put a ring 6
around this S. If you like to eat, make two 7
circles here..................Now cross out the 8
number three. 1 2 3 4 9

Boys and girls like these games because
they are easy. Put a dot in this ring ○ 10
How many feet have you?........How many 11
ears have you?........How many feet has a 12
dog?...... 13

This is fun. Cross out all the o's in
follow. Cross out the l's in little. Cross out 15
the last letter in boy. Put a line under the 16
last word in this sentence. Make two 17
crosses on this line.............. 18

You are doing very well. Keep it up.

Draw a line under the girl's name:
Jack, Jane. Draw a ring around the 19
number six. 2 6 3 7 20

Write yes or no after each of these
questions. Can horses bark?..............Are 21
some trees green?..............Is our flag red, 22
white, and blue?..............Do hens lay 23
eggs?........Does milk come from birds?........ 25
Would you like to have ten dollars?.......... 26

You are a fast reader. How many letters
are in the word two?........How many letters 27
are in the word up?........Write a capital B 28
here..............Put a cross in this ring. ○ 30

Draw a line under the name of a color:
red, pretty. Cross out a word that means 31
big: small, large. Put a ring around a word 32
that means glad: happy, sorry. If you like 33
to play these games, make a circle here........ 34

Draw a line under the right answer.
When does the sun shine? night, day. 35
Which is larger? boy, man. Which is 36
cold? ice, fire. Which is blue? sky, apple. 38
Who is older? mother, baby. 39

Only a few pupils can read as far as this.
How many things make a pair?........Draw 40
a ring around something good to eat:
coal, apple. Put a line under a toy: 41
doll, lake. Put a line under each t in butter. 43

Write the first letter in the word "cat"
here.......... Now write "end" here.............. 45

Score..............................
(Number right)

Score	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Over 30
Grade	1.0	1.4	1.6	2.0	2.3	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.3	4.6	5.0	5.4	5.8	6.1	6.5	6.9	7.3	7.6	7.8	8.1	8.5	8.9	9.3	9.5	9.8	10.1	10.5	10.5+

READING TEST 3. WORD DISCRIMINATION

Directions: Underline the correct sentence in each group.

Sample: The cat runs after the hat.
The cat runs after the rat.
The hat runs after the rat.

Allow 2 minutes

Part 1. Vowels

1. A dog can run fast.
A dig can run fast.
A dug can run fast.

2. We sleep in a bid.
We sleep in a bed.
We sleep in a bad.

3. The mat wore a hat.
The man wore a hot.
The man wore a hat.

4. I like to eat bread and butter.
I like to eat broad and butter.
I like to eat bread and bitter.

5. We get milk from the coo.
We get milk from the cow.
We get milk from the coy.

6. I hop that you will come soon.
I hope that you will come soon.
I hop that you well come soon.

7. He will tape on the door.
He will tap on the door.
He will tip on the door.

8. I am fund of animals.
I am found of animals.
I am fond of animals.

9. Did you knew my brother?
Did you knee my brother?
Did you know my brother?

10. Have you heard what happened today?
Have you hard what happened today?
Have you hoard what happened today?

11. He sent his white callers to be washed.
He sent his white collars to be washed.
He sent his white colors to be washed.

12. His father has a leather belt.
His father has a lather belt.
His feather has a leather belt.

13. The boy put a beetle in the bottle.
The boy put a battle in the bottle.
The boy put a bottle in the beetle.

14. Be sure to sleep on clean budding.
Be sure to sleep on clean beading.
Be sure to sleep on clean bedding.

15. The girl is hopping to go to the picnic.
The girl is hoping to go to the picnic.
The girl is hooping to go to the picnic.

16. Let this accident be a reminder to be careful.
Let this occident be a reminder to be careful.
Let this accident be a remainder to be careful.

17. The rubber confessed that he was guilty.
The robber confused that he was guilty.
The robber confessed that he was guilty.

18. Workmen were hired to constrict the bridge.
Workmen were heard to constrict the bridge.
Workmen were hired to construct the bridge.

19 The man said that he would come latter.
The man said that he would come later.
The man said that he would come letter.

20 He was reworded for finding the expensive jewels.
He was rewarded for finding the expensive jewels.
He was rewarded for finding the expansive jewels.

21. All the problems accept the first are impossible.
All the problems accept the first are impassible.
All the problems except the first are impossible.

22. This author mansions the American Revolution.
This author mentions the American Revolution.
This author mentions the American Revelation.

23. Some people object to foreign imports.
Some people abject to foreign imparts.
Some people object to foreign imparts.

24. The possession is filled by an eminent man.
The position is filled by an imminent man.
The position is filled by an eminent man.

Score..............................
(Number right minus number wrong)

GRADE

Percentile	3	4	5	6	7	8	9
90	11	15	16	17	22	22	23
80	10	14	15	16	19	21	22
70	9	12	14	15	18	20	21
60	7	11	13	14	17	18	19
50	6	10	12	13	16	17	18
40	5	9	11	12	15	15	16
30	4	8	10	11	13	14	15
20	3	7	6	9	12	12	13
10	2	5	5	6	10	11	12

Part 2. Consonants

Allow 2 minutes

1. A little dog is a good pet.
A little dog is a good pen.
A little dog is a good peg.

2. We sleep in a bet.
We sleep in a bed.
We sleep in a bell.

3. Please look at the pretty doll.
Please took at the pretty doll.
Please book at the pretty doll.

4. This paper cost a time.
This paper cost a dine.
This paper cost a dime.

5. The poor man was very tin.
The poor man was very fin.
The poor man was very thin.

6. Give the toy to then.
Give the toy to there.
Give the toy to them.

7. Get the nail at the post office.
Get the mail at the post office.
Get the rail at the post office.

8. Which is the way to town?
Witch is the way to town?
Wish is the way to town?

9. Wash the dishes in the sing.
Wash the dishes in the sink.
Wash the dishes in the zinc.

10. You will get yet in the water.
You will get wet in the water.
You will get whet in the water.

11. The pupil corrected his mistake.
The pupil connected his mistake.
The pupil collected his mistake.

12. Will you consent to the plan?
Will you convent to the plan?
Will you content to the plan?

13. Vaccination presents smallpox.
Vaccination pretends smallpox.
Vaccination prevents smallpox.

14. My derision to go made her happy.
My division to go made her happy.
My decision to go made her happy.

15. I do not know weather it will rain tomorrow.
I do not know whether it will rain tomorrow.
I do not know wetter it will rain tomorrow.

16. This package of sugar is infested with ants.
This package of sugar is infected with ants.
This passage of sugar is infested with ants.

17. The halls resounded with echoes of chimes.
The halls rebounded with echoes of chimes.
The balls resounded with echoes of chimes.

18. We defend on the army for protection.
We depend on the army for projection.
We depend on the army for protection.

19. The boy deserts a liberal allowance.
The boy deserves a liberal allowance.
The boy deserves a literal allowance.

20. The floor squealed as he replaced his steps.
The floor squeaked as he retraced his steps.
The floor squeaked as he replaced his steps.

21. The award will be a blonde medal.
The award will be a bronze metal.
The award will be a bronze medal.

22. She fiercely relented his angry resort.
She fiercely resented his angry retort.
She fiercely relented his angry retort.

23. The wrestler's huge muzzles showed in the photograph.
The wrestler's huge muscles showed in the photograph.
The wrestler's huge muscles showed in the phonograph.

24. Contracting colors appeased to the girl.
Contrasting colors appealed to the girl.
Contracting colors appealed to the girl.

Score________________
(Number right minus number wrong)

GRADE

Percentile	3	4	5	6	7	8	9
90	11	13	15	16	18	22	23
80	10	12	13	15	17	20	21
70	9	12	12	14	16	19	20
60	8	11	12	13	15	17	18
50	7	10	11	12	14	16	17
40	6	9	10	11	13	15	16
30	4	8	8	10	12	14	15
20	3	7	7	9	11	12	13
10	1	5	5	6	10	11	12

Part 3. Reversals

Allow 2 minutes

1. A little bog can run fast.
A little dog can run fast.
A little god can run fast.

2. The man was the cat.
The man saw the cat.
The man sam the cat.

3. A big likes mud.
A dig likes mud.
A pig likes mud.

4. Please do not come late to school.
Please do ton come late to school.
Please do out come late go school.

5. Write your name on the crab.
Write your name on the carp.
Write your name on the card.

6. A dog can bark.
A dog can park.
A dog can dark.

7. The boy used an ax to spilt wood.
The boy used an ax to split wood.
The boy used an ax to slipped wood.

8. Do not bump the garbage on the street.
Do not dump the garbage on the street.
Do not dumb the garbage on the street.

9. I like to eat beard and butter.
I like to eat dread and butter.
I like to eat bread and butter.

10. The red light means spot.
The red light means stop.
The red light means pots.

11. The small boy won the race.
The small boy own the race.
The small boy now the race.

12. The child was blowing soap puddles.
The child was blowing soap bubbles.
The child was blowing soap bulbs.

13. Buy goods of the best quality.
Buy goods of the best qualify.
Buy goods of the best duality.

14. Can you stake on ice?
Can you skate on ice?
Can you takes on ice?

15. The bride looked like an angel.
The bribe looked like an angel.
The bride looked like an angle

16. Healthy pink cheeks need no rogue.
Healthy pink cheeks need on rouge.
Healthy pink cheeks need no rouge.

17. He tried to preform the difficult task.
He tired to perform the difficult task.
He tried to perform the difficult task.

18. Farmers must guard against frost.
Farmers must grand against frost.
Framers must guard against frost.

19. The child who perseveres can except to succeed.
The child who preserves can expect to succeed.
The child who perseveres can expect to succeed.

20. Are you intending to move this month?
Are you indenting to move this mouth?
Are you intending to move this mouth?

21. He was greatly assumed, reading the funny verse.
He was greatly amused, reading the funny serve.
He was greatly amused, reading the funny verse.

22. The calvary paraded to martial music.
The cavalry paraded to marital music.
The cavalry paraded to martial music.

23. The best reader was commended for his skill.
The best reared was condemned for his skill.
The best reader was condemned for his skill.

24. We conserved about antique silver.
We conversed about antique silver.
We conversed about antique sliver.

Score________________
(Number right minus number wrong)

GRADE

Percentile	3	4	5	6	7	8	9
90	11	14	15	15	18	18	19
80	9	13	14	14	16	16	17
70	8	12	13	13	15	15	16
60	7	11	12	13	14	15	16
50	6	10	11	12	13	14	15
40	4	9	10	11	12	13	14
30	3	8	9	10	11	13	14
20	2	6	7	9	10	12	13
10	0	4	5	8	9	10	11

Part 4. Additions and Omissions

Allow 2 minutes

1. The little girl has a black at.
The little girl has a black cat.
The little girl has a black cats.

2. I play a drum in the bad.
I play a drum in the ban.
I play a drum in the band.

3. He rode his pony pass my house.
He rode his pony past my house.
He rode his pony pat my house.

4. This hat cost the most.
This hat cost the mostly.
This hat cost the almost.

5. We eat dinner ever day.
We eat dinner very day.
We eat dinner every day.

6. I gave the book to a fried.
I gave the book to a friend.
I gave the book to a fiend.

7. The boy's farther is a doctor.
The boy's fathers is a doctor.
The boy's father is a doctor.

8. The baby wants to sleep.
The baby wants to sleepy.
The baby wants to asleep.

9. Tie the bundle with a sing.
Tie the bundle with a string.
Tie the bundle with a sting.

10. I have been presents every day.
I have been presently every day.
I have been present every day.

11. We tramped through the forest.
We tramped thorough the forest.
We tramped though the forest.

12. Here is a small particular of sand.
Here is a small participle of sand.
Here is a small particle of sand.

13. This is the largest county in the state.
This is the largest country in the state.
This is the largest count in the state.

14. Two needless are used in knitting.
Two needlessly are used in knitting.
Two needles are used in knitting.

15. The widow kept her car in our garbage.
The widow kept her car in our garage.
The window kept her car in our garage.

16. The artist created a statute from clay.
The artist created a statue from clay.
The artist crated a statute from clay.

17. It is imprudent to spend money lavishly.
It is impudent to spend money lavishly.
It is imprudent to spend monkey lavishly.

18. The invisible team won a gold medal.
The invincible team won a gold medial.
The invincible team won a gold medal.

19. He gave more liberality than others in his locally.
He gave more liberally than others in his locally.
He gave more liberally than others in his locality.

20. The bandit intimidated the crowd with a revolver.
The bandit intimated the crowd with a revolver.
The bandit intimidated the crowd with a revolve.

21. A procession flowed the parade.
A procession followed the parade.
A possession followed the parade.

22. This printed publican is nationally known.
This printed publication is nationality known.
This printed publication is nationally known.

23. He studied, obvious to the conversation.
He studied, oblivious to the conversation.
He studied, oblivious to the conversion.

24. Your direction is really too indefinite to follow.
Your direction is reality too indefinite to follow.
Your direction is really too infinite to follow.

Score ________________
(Number right minus number wrong)

GRADE

Per-centile	3	4	5	6	7	8	9
90	9	12	13	14	16	17	18
80	7	11	12	12	15	16	17
70	6	10	11	11	14	15	16
60	5	9	10	10	13	14	15
50	4	8	9	9	12	13	14
40	3	7	8	8	12	12	13
30	2	6	6	7	10	11	12
20	1	5	5	6	9	9	10
10	0	3	3	5	6	8	9

Score Vowels ....

Score Consonants ....

Score Reversals ....

Score Add. and Om. ....

Total Score ....

Score	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Grade	1.0	1.0	1.1	1.3	1.5	1.6	1.7	1.8	1.9	2.0	2.2	2.4	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.3

Score	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	Over 78
Grade	5.4	5.5	5.6	5.7	5.8	6.0	6.1	6.2	6.3	6.5	6.6	6.7	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.9	8.0	8.2	8.4	8.6	8.8	8.9	9.0	9.1	9.3	9.5	9.6	9.7	9.9	10.0	10.3	10.5	10.5+

ARITHMETIC COMPUTATION

Directions: Write the answers to these problems as quickly as you can. Allow 5 minutes

1\.
(Add)
2
3

2\.
(Add)
4
3
6

3\.
(Subtract)
6
— 3

4\.
(Subtract)
14
— 8

5\.
(Add)
234
461
925

6\.
(Subtract)
322
— 154

7\.
(Multiply)
8
× 3

8\.
(Multiply)
204
× 7

9\.
(Divide)
3) 12

10\.
(Divide)
4) 492

11\.
(Divide)
7) 65

12\.
(Multiply)
23
× 9

13\.
(Subtract)
4203
— 3705

14\.
(Multiply)
37
× 86

15\.
(Divide)
26) 1326

16\.
(Add)
10
2⅓

17\.
(Add)
⅙
½

18\.
(Subtract)
3¼
— 2

19\.
(Subtract)
7
— 5⅛

20\.
(Add)
⅓
¼
⅚

21\.
(Add)
192⅚
21⅓

22\.
(Multiply)
27
× 2⅓

23\.
(Multiply)
⅔ × ¾ =

24\.
(Divide)
¾ ÷ ½ =

25\.
(Multiply)
33
.04

26\.
(Add)
.28
.2
4.936

27\.
(Divide)
8) 2.48

28\.
(Divide)
.002) 90.12

29\.
(Multiply)
32.1
× 1.97

30\.
Write ¾ as a decimal fraction.

Score..................
(Number right)

Score	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Over 24
Grade	1.0	1.6	2.2	2.7	3.0	3.5	3.8	4.1	4.3	4.5	4.7	5.0	5.3	5.5	5.8	6.3	6.6	7.3	7.6	8.3	8.7	9.2	9.7	10.3	10.5	10.5+

SPELLING TEST

Directions: Write the words which the teacher pronounces. One word belongs in each space.

1. A __________ drinks milk.
2. The __________ runs.
3. He __________ a letter.
4. The grass is __________.
5. Please __________ some candy.
6. This is a toy __________
7. You should __________ your lesson.
8. The horse is __________.
9. We __________ very quietly.
10. I live in a very large __________.
11. You can __________ out a candle.
12. Do not __________ around.
13. The train is on the __________.
14. Are you __________ to go?
15. We cook in the __________.
16. Open the __________ wide.
17. Throw the ball __________ the posts.
18. This is __________ eighteen.
19. Why do you __________?
20. She has a __________ new dress.
21. What is the __________?
22. Fold the __________ piece of paper.
23. The __________ pulls the train.
24. I enjoyed my __________ to the country.
25. Many __________ are here.
26. We went to a __________ meeting.
27. The horse pulls the __________
28. The __________ is the man who commands the army.
29. I __________ I saw you
30. What __________ is your hair.
31. What did you eat for __________?
32. My __________ is a good typist.
33. He has very little __________.
34. The __________ collects taxes and makes laws.
35. On my __________ I can answer letters.
36. Be __________ in choosing friends.
37. This __________ is easy.
38. How many yards of cloth are __________ to make this coat?
39. We talked over the __________.
40. The __________ played on the violin.

Score __________
(Number right)

Score	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Grade	1.0	1.3	1.5	1.7	2.0	2.3	2.5	2.7	3.0	3.2	3.5	3.7	3.8	4.0	4.1	4.2	4.3	4.5	4.6	4.7	4.8

Score	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Over 40
Grade	5.0	5.1	5.3	5.4	5.6	5.7	5.9	6.0	6.2	6.4	6.6	6.7	6.9	7.0	7.3	7.5	7.9	8.3	8.9	9.5	9.5+

Part 2. Aptitude Tests

VISUAL TESTS

Letter Memory

Directions: The teacher will show you a card on which is printed a nonsense word. Study the word until the teacher removes the card. Then write as much of the nonsense words as you remember.

Show each card 5 seconds.

1. ....
2. ....
3. ....
4. ....
5. ....
6. ....
7. ....
8. ....
9. ....
10. ....
11. ....
12. ....
13. ....
14. ....
15. ....
16. ....
17. ....
18. ....

Score....................
(Number of nonsense words correct)

AGE

Per-centile	8	9	10	11	12	13	14	15+
90	12	14	15	16	17	17	17	18
80	11	13	14	15	16	16	16	17
70	11	12	13	15	15	16	16	17
60	10	11	13	14	14	15	15	16
50	9	11	12	13	13	14	14	15
40	9	10	11	13	13	13	13	14
30	8	9	10	12	12	13	13	14
20	8	8	9	11	12	12	12	13
10	7	7	7	8	9	10	10	11

Form Memory

Directions: The teacher will show you some designs on a card. Study these designs until the teacher removes the card. Then draw as many of them as you can remember.

Show each card 10 seconds.

Card 1.

Card 2.

Card 3.

Card 4.

Score....................
(Number of single designs correct)

AGE

Per-centile	8	9	10	11	12	13	14	15+
90	10	10	11	11	12	12	12	13
80	9	9	10	10	11	11	11	12
70	8	8	8	9	9	11	11	12
60	7	7	8	8	8	10	10	11
50	6	6	7	7	7	9	9	10
40	5	5	6	7	7	8	8	9
30	4	5	5	6	6	7	7	8
20	3	4	4	5	5	6	6	7
10	2	3	3	4	4	5	5	6

AUDITORY TESTS

Letter Memory

Directions: The teacher will spell aloud the letters of some nonsense words. Listen carefully and when she says "write", write as many of the letters as you can remember.

1...

2...

3...

4...

5...

6...

7...

8...

9...

10...

11...

12...

13...

14...

15...

16...

Score..............................
(Number of nonsense words correct)

AGE

Per-cen-tile	8	9	10	11	12	13	14	15+
90	10	11	11	11	13	14	14	15
80	9	10	10	11	11	12	12	13
70	9	9	9	10	10	11	11	12
60	8	9	9	10	10	11	11	12
50	8	8	9	9	10	10	10	11
40	8	8	8	9	9	10	10	11
30	7	8	8	8	9	9	9	10
20	7	7	7	7	8	8	8	9
10	6	6	6	6	7	7	7	8

Discrimination and Orientation

Directions: This is a test to see how well you can listen. Wait until the teacher tells you what to do.

Sample:	boot	bat	beat	bit
Sample:	X	X	X	X
1.	X	X	X	X
2.	X	X	X	X
3.	X	X	X	X
4.	X	X	X	X
5.	X	X	X	X
6.	X	X	X	X
7.	X	X	X	X
8.	X	X	X	X
9.	X	X	X	X
10.	X	X	X	X
11.	X	X	X	X
12.	X	X	X	X
13.	X	X	X	X
14.	X	X	X	X
15.	X	X	X	X
16.	X	X	X	X
17.	X	X	X	X
18.	X	X	X	X
19.	X	X	X	X
20.	X	X	X	X
21.	X	X	X	X
22.	X	X	X	X
23.	X	X	X	X
24.	X	X	X	X
25.	X	X	X	X

Score..............................
(Number right)

AGE

Per-cen-tile	8	9	10	11	12	13	14	15+
90	22	23	23	24	24	24	24	25
80	21	22	22	23	23	23	23	24
70	20	21	21	22	22	23	23	24
60	19	20	20	21	21	22	22	23
50	18	19	19	21	21	21	21	22
40	17	18	18	20	20	21	21	22
30	15	17	17	19	20	20	20	21
20	13	16	16	18	19	20	20	21
10	7	18	14	17	17	18	18	19

Copying Text

Directions: Copy this little story as quickly and plainly as you can. When the teacher says "Stop", hold up your pencil.

Allow 1½ minutes

A little boy lived with his father in a large forest. Every day the father went out to cut wood. One day the boy was walking through the woods with a basket of lunch for his father. Suddenly he met a huge bear. The boy was frightened, but he threw a piece of bread and jelly to the bear.

Score..............................
(Number of words written correctly)

AGE

Per-centile	8	9	10	11	12	13	14	15+
90	26	27	32	37	43	46	46	48
80	24	25	29	35	38	42	44	46
70	22	24	27	33	37	40	43	44
60	20	23	26	31	36	38	42	43
50	18	20	25	29	33	36	39	40
40	14	19	24	28	31	34	37	38
30	12	17	23	26	29	32	36	37
20	11	15	21	24	27	28	34	35
10	10	12	16	21	24	26	28	30

Crossing Out Letters

Directions: In every other word there is a letter "a". Cross out all of the a's you can find. Remember there is one in every other word. Do it this way: she~~a~~k puk v~~a~~rone le ~~a~~net.

Allow 1 minute

Bot ralentch tokel stad voulte san cherm 3
anoos. Evidid wheal oron vade su av 7
olein sair newok eaey ki poleat selur 10
laes ov prusath. Toshel wanetor tuk 13
splenat olor wark lishes eator, thesur 16
squal se haed sunch, iga niding. Ballon 20
luzzevs thail jiekes, asselum mey jaublet. 23
Mo shoam kleidorp pae synoghet lanke. 26
Prounth ab shill veroaki spleevo ta thrun 29
ake squiton achorles ev sloak dunket, 32
apporenice woll. Lackech woesp traskel 35
wois appin ovilt anevish. Drist flunoat, 38
hispel adenoll, dite risha thi havod hevod 41
thenna. Thop calch eline yeating zellos 44
athern pitoe tad wroke prall ven acholet 48
xeb. Cholat wheb whay, slooter anenine 51
glotes oda morest aberove, lin thoak drist 54
penota, ideok, wark lishes nald neth 57
wonat spliger athern wosk denna. 60

Score..............................
(Number of a's crossed out)

AGE

Per-centile	8	9	10	11	12	13	14	15+
90	32	33	34	42	47	51	51	52
80	29	31	33	38	42	48	48	49
70	27	29	31	35	39	45	45	46
60	25	27	29	33	38	43	43	44
50	24	26	27	32	35	40	40	41
40	23	25	26	29	34	38	38	39
30	22	24	24	28	32	36	36	37
20	21	22	23	26	28	34	34	35
10	19	20	21	23	26	30	30	31

LANGUAGE TEST

Vocabulary

Directions: Here are groups of words, some pairs of which make good sense, while others are foolish. Listen while the teacher reads each group aloud. Decide which pair of words in the group makes the best sense and draw a line under that pair.

Sample:
bed sleeps
baby sleeps
grass sleeps
broom sleeps

Sample:
pretty rose
ugly rose
high rose
ring rose

1.
ball plays
ball rolls
ball eats
ball bats

2.
sour sugar
salty sugar
bitter sugar
sweet sugar

3.
cold fire
cold steam
cold ice
cold sneeze

4.
pen writes
pen cooks
pen fastens
pen hammers

5.
snow scorches
water scorches
steam scorches
fire scorches

6.
saddle canoe
saddle pony
saddle lady
saddle stable

7.
wear gown
hear gown
pour gown
tumble gown

8.
wood melts
milk melts
ice melts
water melts

9.
coin ropes
coin money
coin monkey
coin cobs

10.
dove flies
dove swims
dove barks
dove crows

11.
aged child
aged youth
aged baby
aged man

12.
scissors snip
brushes snip
saucers snip
steams snip

13.
wet desert
dry desert
fruitful desert
eat desert

14.
horse grazes
grass grazes
house grazes
star grazes

15.
fragrant nose
fragrant onion
fragrant rose
fragrant garbage

16.
bell shouts
bell bounces
bell tolls
bell bellows

17.
mourners rejoice
mourners frolic
mourners sun
mourners weep

18.
peaceful war
peaceful sleep
peaceful pie
peaceful hub-bub

19.
generous miser
early miser
liberal miser
stingy miser

20.
humorous comedy
humorous tragedy
humorous union
humorous massacre

21.
delightful dungeon
dismal dungeon
gorgeous dungeon
angry dungeon

22.
courteous curtain
courteous glutton
courteous gentleman
courteous bully

23.
industrious laggard
loitering laggard
prompt laggard
lively laggard

24.
hopeful pessimist
misty pessimist
optimistic pessimist
hopeless pessimist

25.
carnivorous cow
carnivorous wolf
carnivorous rabbit
carnivorous carnival

26.
venerable sage
venerable mention
venerable youngster
venerable novelty

27.
menial master
menial professor
menial servant
menial bully

28.
subterranean mountain
subterranean substitute
subterranean submarine
subterranean cavern

Score.................................
(Number right)

AGE

Per-centile	8	9	10	11	12	13	14	15+
90	20	21	23	25	25	26	26	27
80	18	19	22	24	24	25	25	26
70	17	18	20	23	23	24	24	25
60	16	17	18	22	22	23	23	24
50	16	16	17	21	21	22	22	23
40	15	16	16	20	20	22	22	23
30	14	15	16	19	19	21	21	22
20	13	14	15	17	17	20	20	21
10	13	13	13	16	16	17	17	18

C. H. Nevins Printing Co., Pittsburgh, Pa.

B29809